EDISON ELECTRIC INSTITUTE BULLETIN

FEBRUARY, 1941

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EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

November, 1940

CLASSIFICATION OF SALES (Revised Series)

	1940	1939	%
Number of Customers as of NOVEMBER 30th			
Residential or Domestic	24,907,175	23,940,561	+ 4.0
Rural (Distinct Rural Rates)	683,515	631,277	+ 8.3
Commercial or Industrial:			
Small Light and Power	4,252,548	4,210,591	+ 1.0
Large Light and Power	180,567	186,256	
Street and Highway Lighting	24,166	25,008	.....
Other Public Authorities	89,017	79,278	.....
Railways and Railroads:			
Street and Interurban Railways	200	207	.....
Electrified Steam Railroads	28	31	.....
Interdepartmental	1,278	1,121	.....
Total Ultimate Customers	**30,138,494**	**29,074,330**	**+ 3.7**
Kilowatthour Sales During Month of NOVEMBER			
Residential or Domestic	2,093,071,000	1,872,054,000	+11.8
Rural (Distinct Rural Rates)	131,322,000	120,325,000	+ 9.1
Commercial or Industrial:			
Small Light and Power	1,980,252,000	1,822,411,000	+ 8.7
Large Light and Power	5,369,053,000	4,834,265,000	+11.1
Street and Highway Lighting	201,203,000	197,132,000	+ 2.1
Other Public Authorities	236,769,000	211,030,000	+12.2
Railways and Railroads:			
Street and Interurban Railways	338,487,000	331,245,000	+ 2.2
Electrified Steam Railroads	165,582,000	158,423,000	+ 4.5
Interdepartmental	60,904,000	48,581,000	+25.4
Total to Ultimate Customers	**10,576,643,000**	**9,595,466,000**	**+10.2**
Revenue from Ultimate Customers	**$214,160,800**	**$201,265,000**	**+ 6.4**

RESIDENTIAL OR DOMESTIC SERVICE (Revised Series)

Average Customer Data for the 12 Months Ended NOVEMBER 30th			
Kilowatthours per Customer	945	893	+ 5.8
Average Annual Bill	$36.48	$35.81	+ 1.9
Revenue per Kilowatthour	3.86¢	4.01¢	− 3.7

GENERATION FOR THE U. S. POWER SUPPLY AS A WHOLE FOR THE MONTH OF NOVEMBER
(000's kwhrs)

	1940	1939	%	1938	1937
Fuel	8,501,112	8,218,745	+ 3.4	6,548,017	5,948,652
Hydro	3,928,811	3,121,587	+25.9	3,464,241	3,636,054
Total	**12,429,923**	**11,340,332**	**+ 9.6**	**10,012,258**	**9,584,706**

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 9 FEBRUARY, 1941 No. 2

Our Problem Is to Run A Successful Business

Once we get a customer on our lines, we ought to make it so easy for him to take electricity, so easy for him to add this electric servant, that device, that he would never consider anything but electricity as his source of heat, light and power—electricity should be to the customer as a plate of candy is to a seven-year old.

By H. E. Dexter

Vice-President in Charge of Commercial Relations, Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y.

OUR business is a service business, but to succeed as a service it must also succeed as a business. However, we must never overlook the fact that to succeed as a business means that it must be financially successful.

One of the requirements of a financially successful business is that it just cannot stand still; it must either advance or fall by the wayside. To advance it must hold the bulk of its present business and continually add some new business.

The job of holding business and adding new business is the function of the commercial organization. We in the commercial department cannot get very far without the full, understanding support of the rest of the industry. We cannot sell the customer something he really doesn't want—something that just doesn't fit his needs—and it doesn't do the rest of the industry any good to make something the customer will not buy. The commercial job is a problem of finding out what the customer really wants—not what we think he wants—and then seeing that the industry produces this service for delivery to the customer. If we have a service that will be really useful to the customer within the price he can afford to pay for it, we can create a desire for it, we can sell it, but it must first meet the customer's needs.

Of course, it is the commercial department's responsibility also to inform itself accurately as to just what the company has to sell—the inherent cost characteristics and service limitations—so as to be able to exploit the market for our service to the maximum advantage of the company and of the great number and variety of our customers. The biggest contribution that the commercial organization can make to the company's financial success is to put its greatest effort into the promotion of the business that will add the most profit to the company, but still will not neglect the service angle of the business.

It seems imperative to me that we see our business through the customer's eyes, and that we exert all our ingenuity and resources to make our business attractive to the customer, while at the same time profitable to ourselves. Electricity has traveled far from the glamorous laboratory era, and is now regarded by our customers pretty much as a commonplace commodity which can be supplied not only by ourselves but by political agencies, or even by small semi-automatic plants, with no great trouble. The result of this attitude is to throw our business more and more into the traditional position of the ordinary competitive business which must always concentrate on cultivating and seeking the favor of its customers.

Why do some customers buy Diesel engines? Why do some of them still use steam engines? Why do some customers use bottled gas? They use these other services because in the customer's own opinion at the time he purchased the equipment it fulfilled his needs better than electricity did. In his opinion it may have been free from occasional long interruptions, it may have been cheaper; perhaps he could arrange to pay for the service more to his satisfaction; for example, by writing off the entire cost of the Diesel plant in a good year, and in a bad year when business is poor, only pay actual operating cost. In the case of bottled gas the initial cost may have been lower.

Reliability of service is an important factor to the customer, and an item that you probably will not question as far as the congested city area is concerned, because most of us live in cities and know the city problems. On the other hand, don't we usually think of interruptions rather mechanically as of so many minutes' duration? Do you ever sit down and look at an interruption from the customer side of the picture?

Well, let's take just a moment and do that. Electricity has become such an integral part of our lives that it is almost impossible, and certainly very impractical for anyone in the home, the store or the factory to get along without it.

This is particularly true in the small hamlet or outlying area. When the current is off for any length of time, the pump refuses to work, and with this the sanitary system ceases to function. The electric range will not cook, and in the country there isn't a delicatessen just around the corner. If it is winter, the oil burner refuses to work and the home is pretty well tied up.

The farmer, who in general is an expensive customer to serve, is hit still harder. If an interruption occurs during milking time, he is up against it. The cows must be milked regardless of the

electric supply, and this is some job to accomplish when a man hasn't been in the habit of milking by hand regularly. In the hatching season a long interruption may result in a real financial loss to a farmer.

Before leaving this subject of reliability we mustn't overlook the electric clock. Our service is usually so good that our people are living by electrical time. Interruptions which occur occasionally at night, when the customer normally would not be affected, always show up on the clock, and if a customer is depending upon an electric alarm clock, as many of them do, the results may be very embarrassing. Occurrences which the customer doesn't like are not good for our business even if we feel that they may be unavoidable or beyond our control.

So much for reliability of the service. How about new customers and added requirements for old customers? Gentlemen, the human side of our business is the most important item. The proper contact with the customer is the greatest asset a company can have. Now this contact is not kept by social calls or by joining a service club, but by respect for the way we handle our business and the kind of service we render.

When a customer lays before us his problems requiring the use of electricity in their solution, that for the moment is the most important thing in the world to him. It is more important to him that we fully understand his problems than it is that we find the solution, because we never can find a satisfactory solution from his point of view until we fully understand him. Take yourself, for example; how often have you gone into a store to buy some particular article and had the clerk attempt to sell you something else just as good, at less money? The fact is that usually it isn't just as good for your purpose, but the dealer or his clerk makes more money by its sale, or is perhaps entirely out of the particular article that you want and hasn't the good judgment to say so and offer to get it for you. Did you like that sort of treatment? You bet you didn't.

In our anxiety to get business we mustn't forget that the customer is only a human being like ourselves. Let us give him an attentive ear and remember that more business enemies are made, and more business lost because we do not listen to the customer and therefore do not fully get his meaning, than for any other one reason.

As I have said before, we have a social duty to perform and we have a responsibility to fulfill. We must serve electricity to everyone in our franchise territory if they want it. Once we have found out what our customer needs in the way of electric service, we should never say no to him. Our answer should always be "Yes, we can serve you, but the price will be.....".

Now it has been my experience that the customer doesn't expect something for nothing. He is willing to pay a fair price for service well performed or well rendered. Of course we must expect to supply our service at a price reasonably competitive with what he could make it for, or for what he could replace it, when all factors are taken into consideration, and we should always make our price free from burdensome restrictions and penalties.

One of the principal advantages of electricity is its flexibility—the fact that the customer doesn't need to buy it ahead of time and store it; it is always on tap at the press of a button. Let's not destroy this vital asset by attaching a lot of restrictions as to its use. We may make an inducement in the price if he uses it a certain way, but let's do it in such a way that the customer realizes we are passing on to him our savings in cost if he cooperates with us to use up some cheap energy that we may have available, rather than penalize him for breaking some rule or penalty that we may have inserted in our rate schedule. The customer isn't interested in power factor or load factor. His principal interest is in making money out of his own business. If we can show him how to save money by cutting his power cost, fine business—never penalize him for being our customer.

There are certain general trade practices that every customer understands, whether he be a large power customer or a country drug store. One is discount for quantity purchases, and another is that when he buys a commodity it is his and he can do as he likes with it.

Many of our customers do not understand demand and power factor, and why should they? Did you ever stop to think that if our business hadn't started as a direct current business, we probably would have sold kva and not kwhr, and many of the worries that we now have would be eliminated? Every customer needs some magnetizing current. Why bill him for the power component and give him the magnetizing component free, or worse yet, psychologically hit him on the head with a penalty if he uses over a certain amount of magnetizing current. It isn't very logical, is it? Well, I realize we are now too far along the road to change this practice completely, but let's minimize it as much as possible.

There are very few of our customers who really understand what a kwhr is anyway. It is usually possible to get over the idea that it is a unit of electricity just as a pound is a unit of weight used in purchasing butter, or a quart a unit of weight in purchasing milk. But when we try to bring in the kva or explain the question of power factor, the customer is helplessly swamped. There is no one else with whom he does business that measures the commodities which he buys (and electricity is a commodity to him) in some mysterious manner which he just can't understand.

Our problem is to run a successful business. In studying our costs we may have to go into kva, power factor and load factor, but let's screen all that for the customer's view—bill him in simple terms, but still on a basis that is profitable.

Once we get a customer on our lines, we ought to make it so easy for him to take electricity, so easy for him to add this electric servant, that device, that he would never consider anything but electricity as his source of heat, light and power. *Electricity should be to this customer just as a plate of delicious chocolate candy is to a seven or eight year old kid.* It should be so irresistible that the customer cannot refrain from reaching out and taking just a little more. It is really marvelous how a customer's use of electricity will gain from year to year when he is given this treatment.

There are just one or two specific problems that I would like to call to your attention. One is the question of demand indicators. Demand forms of rates are apparently likely to stay with us for some time, and in all probability demand indicators will be used down to as low as 5 kw. At present they are expensive and costly to maintain, all of which enters into the cost of service. This metering problem needs attention.

Another is the matter of fluorescent lighting. This will offer us a wonderful opportunity to sell more and better lighting to our customers. It will give the customer an opportunity to have a quality of lighting up to now impossible to obtain, and a much larger quantity for the same price. On the other hand, there

are some headaches in connection with it. There is the matter of power factor and the effect upon present revenues. Personally I think we should be very open-minded about this business. In the first place the matter of power factor can be handled without added cost in everything but the 2-foot tubes by selling balanced units, and the 2-foot tubes will probably not be sold in large enough quantities to offer any real serious problem before some manufacturer finds a satisfactory answer.

In the case of the revenue, this is again a sales problem. I find from experience that in a well laid out lighting installation the quality of the lighting is so much improved, particularly as regards color characteristics, that the fluorescent installations are being used much longer hours than in the case of the old incandescent jobs. The result is that in many cases we are obtaining the same kilowatt hour usage with a 30% less demand on our system than was the case with the previous incandescent jobs, and the customer is obtaining twice as much light.

I cannot leave this subject without saying something about our competition. At the present time, and perhaps for the next two years, competition from small Diesel engines will be at a minimum. At the end of that period manufacturers of Diesel engines will be looking for this kind of business. During this period we should endeavor to get motors of 10, 15 and 25 hp that can be thrown directly on the lines without starting compensators, with a maximum current on starting of not to exceed 125% normal starting current, and a price not to exceed the present basis for the high starting current motor, less compensator.

From the customer's point of view, a starting compensator is an unnecessary adjunct. In many cases the cost is equivalent to the price of the motor and apparently could be entirely eliminated by a proper motor design. The cost of this starting equipment is a hurdle to get over in new motor installations.

Another form of competition is the municipal and government sponsored plants proclaimed as yardsticks. In meeting this competition we must make it our business to sell kwhr's and not supply a lot of extra so-called free services whose cost is actually buried in the price per kwhr.

It is important that we get price just as low as possible and still render good service and make a reasonable profit for ourselves. In accomplishing this, it is important that we make our point of delivery at the entrance to the customer's property and allow the customer to do anything he likes with it after he takes delivery. Any service or repair work required by the customer beyond the delivery point should preferably be performed by or contracted for by the customer with some agency other than the utility.

There are several very good reasons for this; first, in the case of large power jobs, where our engineers lay out substations and distribution systems for customers, we almost always make a more expensive layout than is justified in the customer's mind. It is easy to see how this comes about. Our engineers are accustomed to dealing with a more stable and fairly long life business. Our property life is usually of the order of 20 or 25 years, whereas the ordinary factory equipment life is more like five years or even less, due to obsolescence or a change in manufacturing requirements.

In my opinion it is much better for us, from a public and customer relations angle, to stick to our own business—the manufacture and sale of energy (kwhr's) and leave the engineering and construction work on customer's property to the customer or whomever he elects to employ for this work. Give the customer the best advice you can when he asks for it or needs it, but work, no—suggest where he can get it done.

The reason for this is simple. There are few, if any utilities, that can compete with outside electrical contractors or electricians in doing service or construction such as is usually carried out on customer's premises. Our people are trained to work live lines which in most cases require special safety precautions that add to the cost of doing the work. Most work on the customer's property can be performed on dead circuits, using a very different technique, with a resultant lower overall cost.

Most of our difficulties, expensive negotiations and complaints come from customers because of what might almost be termed "extra-curricular operations." As far as electricity is concerned, we have an extremely simple business in our relations with the customer. As a matter of fact, practically a cash business, where, if the service is as good as it should be, the only question on the part of the customer is—what is my bill?

Our business is the manufacture and sale of electricity. Let's keep to it! Give advice when it is desired or needed, sell the customer on new ways in which he can use our service to advantage, but let's not get entangled in any unnecessary side lines—they are seldom ever profitable.

I would like to leave a point of view with you. The customer is our boss. If we don't give him what he wants when he wants it, and at a price he considers fair, how long do you think he is going to keep us on his payroll? How long would you keep us on your payroll if you were in the customer's place? If we apply this thinking to our problems, always keeping in mind that if we are to succeed as a service we must also succeed as a business, we can't go far wrong.

Employees' Mutual Aid Society Celebrates 50th Anniversary

THE Employees' Mutual Aid Society, Inc., of the Consolidated Edison Company of New York—one of the pioneer organizations and one of the largest of this type of society in the country—celebrated its golden anniversary the week of February 10.

The Society was organized February 17, 1891, as the Gas Companies Employees' Mutual Aid Society with 411 charter members who were employed by Consolidated Gas Company and affiliated gas companies. Its purpose was to cultivate social and fraternal relations among its members and its first accomplishment was the establishment of a Mortuary Fund maintained by monthly dues of fifty cents and paying a death benefit of $300 to the beneficiary of a deceased member. Later a system of sick pay was added.

The Mutual Aid Society now has a membership of nearly 25,000 covering both gas and electric employees of Consolidated Edison Company and employees of New York Steam Corporation, Consolidated Telegraph and Electrical Subway Company and Green Mountain Lake Farms, Inc., which are affiliated companies. Similar organizations function for the employees of Brooklyn Edison Company, New York and Queens Electric Light and Power Company, Westchester Lighting Company and The Yonkers Electric Light and Power Company, other companies in the Consolidated Edison System.

With joint support of the Society and the employer companies, an extensive system of employee benefits and social and athletic activities is maintained. This includes group insurance, sick benefits, medical and dental care and hospitalization and a convalescent farm. Social activities range from dances and entertainments to photography and stamp and coin collectors clubs and gardening. The Society has a well appointed athletic field at Astoria and its sport activities include baseball, handball, tennis and bowling, swimming and riding. In addition the Society administers a relief fund for special aid to its members when needed, holding an annual entertainment and dance which has to be given on two nights to accommodate attendance of about 12,000.

During its existence the Society has paid out more than eight-and-a-quarter million dollars in death benefits, several million dollars in sick benefits, and its members now have in force group insurance amounting to about sixty million dollars.

Domestic Electric Appliances in 1940

IN the sale of electric appliances, 1940 surpassed all previous years. New high figures were set for refrigerators, ranges and many of the smaller appliances, while a relatively new arrival, the glass coffee-maker, made a conspicuous record.

The following table gives a preliminary estimate of the amount of electricity used by the various larger appliances in domestic service last year and the results since 1920 are shown graphically on the chart.

Because it is impossible to distinguish between appliances bought by farmers and those bought by the general public, the classification "domestic service," as used here, includes all current supplied to all non-farm homes and for all farm uses except irrigation pumping. It must not be confused with "residential" service, which does not include farms.

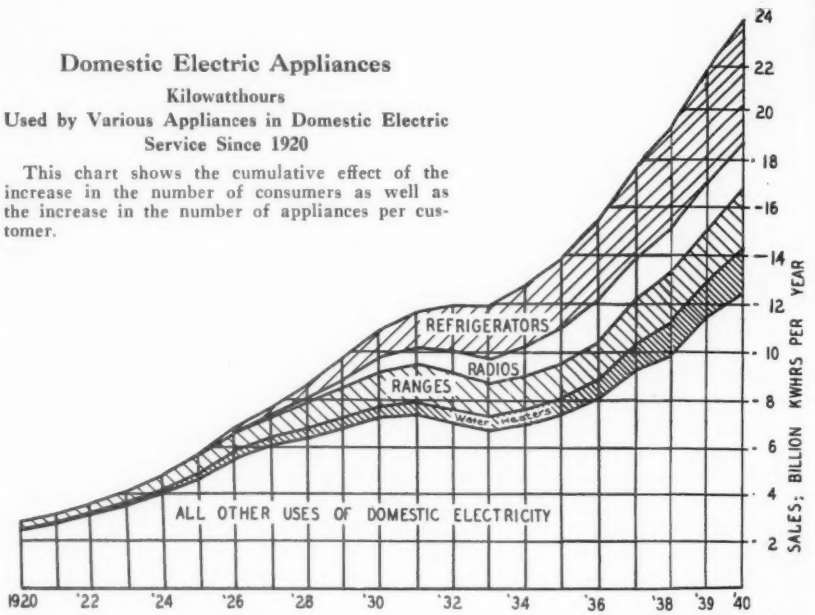
Some changes have been made in the averages covering the "normal" annual electrical use of several of the appliances. The average for the refrigerator has been reduced to 382 kwhr in accordance with the increasing efficiency of the modern unit, as shown in detail in the table accompanying Mr. Greenwood's article in the EEI Bulletin last month, while the averages for water heaters (all types) and for oil burners have been increased a little.

The largest numerical gain in kilowatthours over the previous year has been in lighting and the use of miscellaneous small appliances, which increased by nearly 900 million kwhr and whose estimated use per customer now stands at 333 kwhr per year.—W. M. C.

Domestic Electric Appliances

Kilowatthours Used by Various Appliances in Domestic Electric Service Since 1920

This chart shows the cumulative effect of the increase in the number of consumers as well as the increase in the number of appliances per customer.



Energy Used by Domestic Electric Appliances

An Estimate for the Year 1940

(Residential and Farm Service, Excluding Irrigation Pumping)

Appliances	Number in Homes On Dec. 31, 1939 (1)	Number in Homes On Dec. 31, 1940 (2)	Saturation (3)	Average Number in Homes in 1940 (4)	Kwhr per Year per Appliance in Normal Use (5)	Per Cent in Normal Use (6)	Effective Kwhr per year per Appliance (7)	Total Kwhr Used in 1940 (8)
Lighting & miscellaneous uses	.....	.....	.....	(Per customer 333 kwhrs)		..	....	8,346,000,000*
Refrigerators	14,000,000	16,235,000	64%	15,117,500	382	90	344	5,200,000,000
Ranges	2,200,000	2,556,000	10%	2,378,000	1,200	85	1,020	2,425,000,000
Radios & Phonographs**	24,000,000	25,500,000	100%	24,750,000	100	80	80	1,980,000,000
Water heaters (all types)	700,000	800,000	3%	750,000	3,500	75	2,625	1,970,000,000
Flatirons**	24,500,000	25,500,000	100%	25,000,000	80	80	64	1,600,000,000
Oil Burners	1,735,000	2,000,000	8%	1,867,500	275	95	260	485,000,000
Washing Machines	11,750,000	12,350,000	48%	12,050,000	30	80	24	289,000,000
Vacuum Cleaners	14,100,000	15,000,000	59%	14,550,000	24	85	20	291,000,000
Roasters	985,000	1,230,000	5%	1,107,500	300	75	225	249,000,000
Percolators, glass	2,950,000	3,750,000	15%	3,350,000	80	75	60	201,000,000
Percolators, metal	4,625,000	4,625,000	18%	4,625,000	50	50	25	116,000,000
Toasters	12,450,000	13,050,000	51%	12,750,000	30	50	15	191,000,000
Electric Clocks	12,200,000	12,800,000	50%	12,500,000	15	95	14	175,000,000
Ironing Machines	1,450,000	1,575,000	6%	1,512,500	125	80	100	151,000,000
Space Heaters	5,100,000	5,400,000	21%	5,250,000	50	50	25	131,000,000
Total Appliances	.....	.....	.....	.....	....	..	....	15,454,000,000
Total Domestic Service	.....	.....	.....	(Per customer 950 kwhrs)		..	....	23,800,000,000*
Number of Customers	24,565,000	25,500,000	.....	25,032,500				

Notes: Columns (1) and (2): Estimates largely from ratios shown in "Electrical Merchandising" and other trade papers; being based upon the summation of annual sales of appliances less an estimated replacement demand. Column (4): The arithmetical average of columns (1) and (2). Column (6): An estimate allowing for duplicate and unused appliances, houses unoccupied; summer cottages, vacation periods, etc. Column (7): The product of Columns (5) and (6), representing the actual kwhr per year per average appliance in the home. Column (8): The product of Column (4) and Column (7).

* Preliminary figures.

** Many homes have duplicate sets of radios and flatirons, whose grand total is not possible of determination. From general indications, however, it appears that these duplicate sets do not greatly change the total amount of electricity used. In this table, therefore, the assumption is made that the saturation of these appliances is complete and the energy use is calculated upon the total number of homes.

A Study of Water Heat Demands

Showing Effect of Various Capacities of Heaters, With and Without Control

By R. E. Gale and J. F. Emery

Commercial Manager and Assistant Superintendent of Distribution, respectively, Idaho Power Company

In P.U.C. Oregon Order No. 6433 (U-F-893), dated March 7, 1939, all Class A, B and C electric utilities operating in the State of Oregon were required within one year to make such investigations and studies as would demonstrate the necessity for the continuance in their rates, rules and regulations, of provisions excluding the use of 3000-watt single-unit water heaters of standard factory-make from their service areas, and at the same time to justify to the Commissioner the continued use of water heating control equipment of any character. This order was the outgrowth of a series of conferences and hearings held over a period of the preceding year, at which representatives of the various utilities, and also of manufacturers and the public were present and were given the opportunity to be heard with reference to domestic water heating problems.

On Feb. 24, 1940, a final hearing was held at Salem, Ore., at which representatives of various utilities were present. Idaho Power Company was represented at this hearing by Mr. R. E. Gale, Commercial Manager, and Mr. J. F. Emery, Assistant Superintendent of Distribution. A portion of the testimony given by Mr. Gale is summarized herein since it not only reviews some of the problems and experience of Idaho Power Company in the water heating field, but also discusses and illustrates tests which had theretofore been made by Idaho Power Company concerning the effect of water heating load upon peak demands, residential load factor, and other phases of the Company's operation.

As of December 31, 1939, Idaho Power Company was serving in excess of 52,000 customers on its Schedule No. 1, Residential Service, under which the rate for service is uniform throughout the territory served from the Company's interconnected system both in Idaho and eastern Oregon. Of these 52,000 residential and farm customers, approximately 3,500 domestic customers were served in the Company's territory in Oregon, which comprises a portion of Baker and Malheur Counties in the eastern part of the State.

Company sales records indicate that the system water heater saturation is approximately 24%. In other words, approximately one customer in four, or a total of 12,500 customers, are taking advantage of electric water heating service. Records indicate that the ratio of water heating saturation in Oregon is 21.4% (approximately 750 installations), or slightly less than on the system as a whole. As pointed out in the Commissioner's Order No. 6433, Idaho Power Company has one of the highest water heating saturations of any electric utility in the west, and this saturation is probably more than ten times the national average. This has resulted from the fact that the Company was one of the first electric utilities in the United States to recognize the load building possibilities of electric water heating service. Idaho Power Company began its water heating promotion at a time when water heaters suitable for household and farm use were not readily available on the appliance market, and the Company actually developed several early types of heater, thus providing an impetus for the manufacturing industry.

As a result of these early campaigns, which have been aggressively continued down to the present time, the Company has obtained valuable, although sometimes costly, experience both in the establishment of rates for domestic water heating service, and as to the effect of various types and sizes of water heaters, both controlled and uncontrolled, upon system operations.

The present provisions in the Company's Schedule No. 1, relating to water heating service, are based upon the results of many years' experience, some of which has been by the trial and error method, but a great deal more of which has been the result of consistent and planned study and research. The present provisions relating to water heating service in Idaho Power Company's Schedule No. 1 are as follows:

"NET MONTHLY RATE:

When the water heater installation conforms to the Specifications and Limitations as hereinafter stated, a discount of one-half cent (½¢) per kwhr applies to kilowatt hours in excess of 200 kwhr, except that the discount shall not apply to excess consumption greater than the following:

Automatic Electric Storage Tanks With Interconnecting Thermostats

12 to 19 Gal. Tank, one heater ...200 kwhr
20 to 29 Gal. Tank, one or two heaters ...275 kwhr
30 to 39 Gal. Tank, two heaters ..350 kwhr
40 to 49 Gal. Tank, two heaters ..425 kwhr
50 to 59 Gal. Tank, two heaters ..500 kwhr
60 to 69 Gal. Tank, two heaters ..650 kwhr
70 or more Gal. Tank, two heaters 800 kwhr

Installation Without Interconnecting Thermostats

20 kwhr per 100 watts for the first kw of heater capacity
7.5 kwhr per 50 watts of additional heater capacity

* * *

"SPECIFICATIONS AND LIMITATIONS:

Water heater discount specified above is applicable only when water heater installation complies with the following Specifications and Limitations:

1. Water tank, and heater if of an external type, are provided with an efficient insulation approved by the Company.

2. Heating units are non-inductive of types and characteristics acceptable to the Company. Installations in excess of 1.5 kw consist of two heating units, a 'base' unit placed so as to heat the whole tank, and a 'booster' unit placed so as to heat not more than the upper one-third of the tank. The 'booster' unit has a capacity of not more than twice that of the 'base' unit. Each heating unit is controlled by an individual thermostat approved by the Company.

3. The maximum allowable combined capacity of heating units is:
90 watts per gallon of tank capacity for 20-gal. tanks or smaller.
70 watts per gallon of tank capacity for 30-gal. tanks.
62½ watts per gallon of tank capacity for 40-gal. tanks, or larger.
(The Company may, at its option, limit service to water heaters under this schedule to a maximum of 5 kw total heater capacity.)

4. The Company may, at its election and expense, install a time switch, carrier current control, or other device to limit the hours of service to the water heater. The period or periods of each day, during which service is so limited, shall not exceed a total of six hours; the hours to be specified from time to time by the Company."

It will be seen that the above specifications do not prohibit or exclude the use of water heaters of any particular size or design (except the optional limitation of 5 kw total heater capacity), but they do provide certain conditions under which a discount of ½c per kwhr will be allowed for the normal requirements for water heating service. These conditions were adopted on the basis of long experience, so as to make it possible to serve the water heating load with only a slight addition to the capacity already required to serve the balance of the domestic load—and the accomplishment of this objective would seem to be the only basis upon which water heating service can reasonably be sold for less than the rates for other classes of residential service.

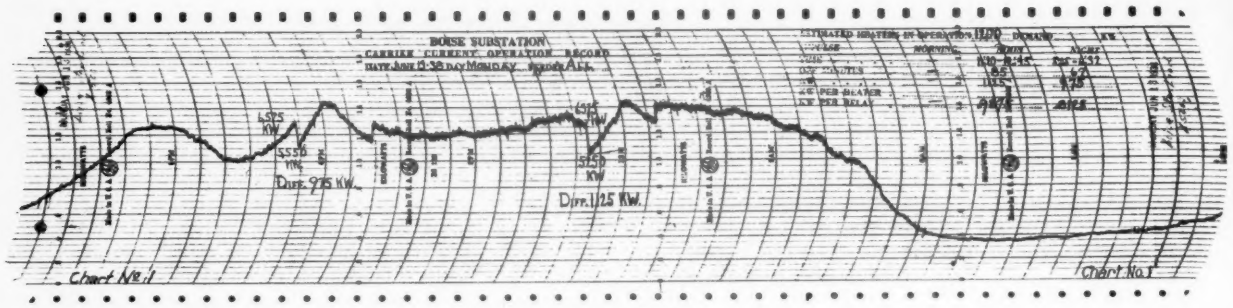


Chart No. 1

If the water heating load tends to create an additional system peak which would require additional capacity and additional investment solely for water heating requirements, there would seem to be little reason why water heating rates should not be substantially the same as for domestic lighting, cooking or refrigeration service.

With installations made in accordance with the above specifications, the Company found that any size family can secure satisfactory hot water service. From the Company's standpoint, the water heating load has a good load factor, and a considerable amount of energy is delivered during the night valley of the load curve, from 11 p. m. to 6 a. m. *And at the present time this type of heater, when controlled, is being served on the Idaho Power Company system with an average of only 50 watts (0.05 kw) of added distribution capacity per heater during the peak period.*

That our customers are receiving satisfactory service from a reasonably priced installation is evidenced by the fact that few, if any, complaints are received, and also by the fact that *during the last four years, an average of more than 4½% of our residential customers have purchased this type of installation each year.*

Chart 1 illustrates the manner in which the Company has been able to avoid installing additional capacity to serve its water heating load. The chart shows the total substation load at Boise, Idaho, on Monday, June 13, 1938.

This test covered the seven residential feeders in Boise, under normal use conditions, serving a total of approximately 1,200 standard water heater installations. The heaters are of the two-unit type, with interconnected thermostats, having carrier control on the lower or base units only. As indicated, the lower units were turned off (by carrier current control) at 11:20 a. m., and on again an hour and twenty-five minutes later at 12:45 p. m. It will be noted that a load of 1,125 kw was picked up when the heaters were turned on, for 1,200 heaters in service, or approximately 0.9 kw per heater. In the evening the lower units were again turned off for an hour and twenty-seven minutes, from 5:05 until 6:32 p. m. When the heaters were turned on, the additional load picked up was 975 kw, or approximately 0.8 kw per heater. It is recognized that the above demands are somewhat greater than the additional peak that would have been created had all heaters been left on throughout the peak period, due to diversity.* However, it is obvious that had these 1,200 heaters not been controlled, an additional peak would have been created, necessitating additional system capacity exclusively for the water heating load.

Charts 2, 3 and 4 show the effect of heater capacity upon load factor, average heaters in service, or approximately 0.9 demand which is created immediately following the off-service interval.

Chart 2 shows that low-wattage two-unit installations can be disconnected during the peak period and later returned to the line without establishing a peak or even an abnormal demand following the off-service interval. A low demand of 0.48 kw per heater is established, and an exceedingly good water heater load factor of 65.1%. Likewise, it will be noted that a considerable quantity of water heating kwhr are supplied during the night valley hours from midnight to 7 a. m.

Chart 3 was obtained from the same customers as Chart 2, except that the wattage of the two heater units was increased from 600 watts to 1,000 watts per unit in each heater. It will be noted that the demand immediately following the off-service interval has been increased to the extent that additional peaks were created when the heaters were turned on; the water heating demand per customer increased from 0.48 kw (with the 600 watt units) to 0.89 kw; and the water heating load factor decreased from

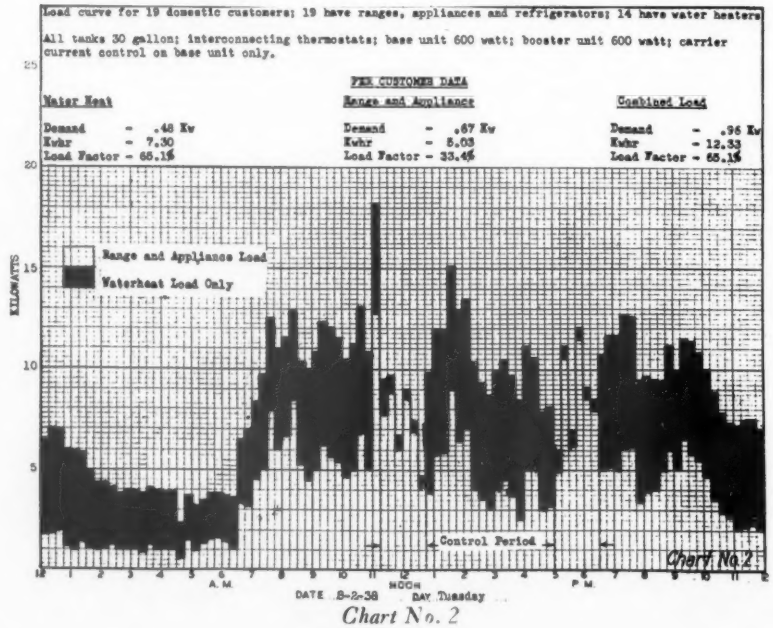

Load curve for 19 domestic customers; 19 have ranges, appliances and refrigerators; 14 have water heaters
All tanks 30 gallon; interconnecting thermostats; base unit 600 watt; booster unit 600 watt; carrier current control on base unit only.
PER CUSTOMER DATA
Water Heat
Demand - .48 Kw
Kwhr - 7.30
Load Factor - 65.1%
Range and Appliance
Demand - .67 Kw
Kwhr - 5.03
Load Factor - 33.4%
Combined Load
Demand - .96 Kw
Kwhr - 12.33
Load Factor - 65.1%
KILOWATTS
Range and Appliance Load
Waterheat Load Only
Control Period
Chart No. 2
DATE 8-2-38 DAY Tuesday

Chart No. 2

* See discussion of 1939 test, Page 49, and Chart No. 7.

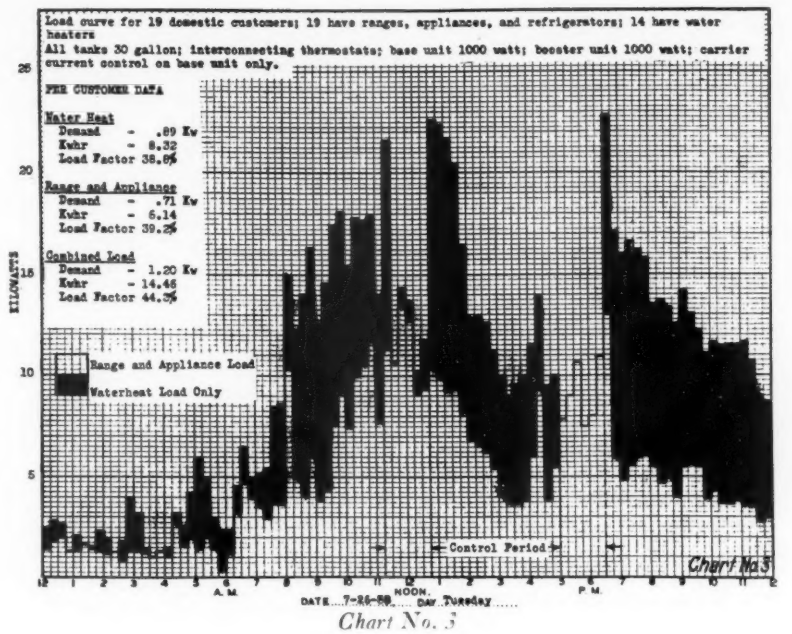

Load curve for 19 domestic customers; 19 have ranges, appliances, and refrigerators; 14 have water heaters
All tanks 30 gallon; interconnecting thermostats; base unit 1000 watt; booster unit 1000 watt; carrier current control on base unit only.
PER CUSTOMER DATA
Water Heat
Demand - .89 Kw
Kwhr - 8.32
Load Factor 38.8%
Range and Appliance
Demand - .71 Kw
Kwhr - 6.14
Load Factor 39.2%
Combined Load
Demand - 1.20 Kw
Kwhr - 14.46
Load Factor 44.3%
Range and Appliance Load
Waterheat Load Only
KILOWATTS
Control Period
Chart No.3
A.M.
NOON
P.M.
DATE 7-26-38 DAY Tuesday

Chart No. 3

65.1% to only 38.8%. In addition, there was a material decrease in the number of water heating kwhr supplied during the early morning hours.

Chart 4 shows the further effect of increasing the two heater units from 1,000 watts to 1,500 watts each. Both the demand and peak following the off-service interval are greatly increased, and the water heating demand has increased to 1.15 kw, as compared to 0.48 kw with the 600-watt units, and 0.89 kw with the 1,000-watt units. Load factor decreased to only 29.7%, and very few water heating kwhr were used during the night valley period of the load curve. thus further increasing the period of idleness of the utility's equipment required to serve the customer.

Other tests made with carrier current control indicate that as the size of the heating unit or units is increased, the undesirable characteristics illustrated above are greatly magnified unless the size of the tank and the consumption of hot water by the customer are both increased in proportion to the increase in heating element capacity. The Company is convinced that, as applied to its own system and conditions of operation, any increase in the established ratios of heater capacity to storage tank capacity would result in a detrimental decrease in the load factor of the water heating load, and in water heating energy being unnecessarily used during periods when generating and distribution capacity could more economically be used for other service.

On the other hand, further tests made with carrier control indicate that on the Idaho Power system one water heater of the above specifications may be added for every range connected without establishing a higher peak when control is effective; whereas a similar saturation of uncontrolled heaters, or even controlled single-element heaters, will definitely create new and higher demands. This was likewise substantiated in a test made at Portland, which indicated that a far greater saturation of double-element heaters is possible than of single-element heaters. This fact takes on added significance when considered in relation to the problem of Idaho Power Company, on whose system existing water heater saturation is several times that of the larger companies operating in the Portland-Salem area.

A survey (1938) of 984 residential customers in Boise, Idaho, resulted in the following information as to average use and gross revenue:

Use	KwHr	Total KwHr	Total Revenue Per Month	Additional Revenue Per Year	Total Revenue Per Year
Lights ...	27	27	$1.70		$20.40
Refrigerator .	37	64	2.70	$12.00	32.40
Range ...	88	152	4.69	23.88	56.28
Water heater	.231	383	7.38	32.28	88.56

It is thus seen that the electric water heater presents itself as a major domestic load building possibility. It should be noted, however, that the water heating rate is 1c per kwhr as compared with approximately 2.7c for all domestic service. Gross revenues mean little until they are compared with the cost of furnishing the service; and because of the nature of the water heating load, and the large proportion of the total kilowatt hours used for water heating service in an all-electric residential installation, it is essential that water heating service be supplied on a profitable, or at least a self-supporting basis.

Rates for all classes of service have been, and it is hoped will continue to be reduced. There is no class of electrical service sufficiently prosperous to subsidize

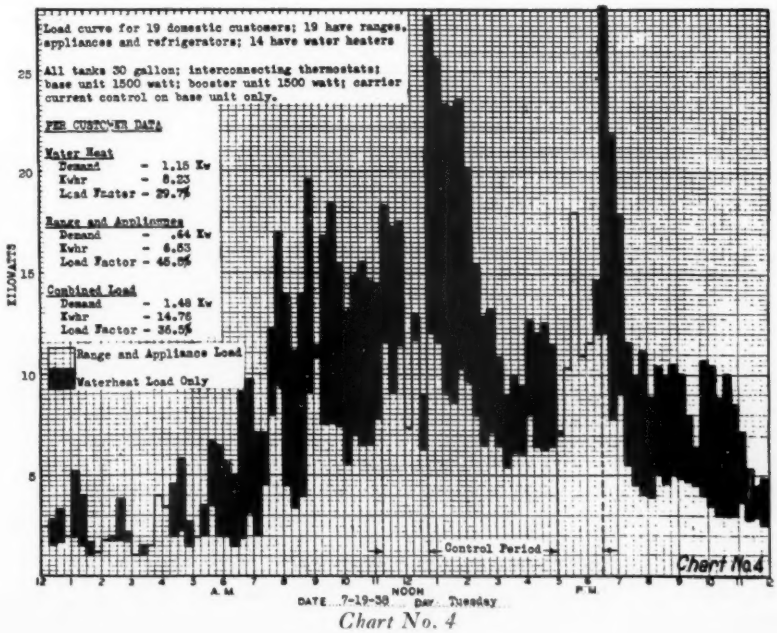

Load curve for 19 domestic customers; 19 have ranges, appliances and refrigerators; 14 have water heaters
All tanks 30 gallon; interconnecting thermostats; base unit 1500 watt; booster unit 1500 watt; carrier current control on base unit only.
PER CUSTOMER DATA
Water Heat
Demand - 1.15 Kw
Kwhr - 8.23
Load Factor - 29.7%
Range and Appliances
Demand - .64 Kw
Kwhr - 6.53
Load Factor - 45.8%
Combined Load
Demand - 1.48 Kw
Kwhr - 14.76
Load Factor - 36.5%
Range and Appliance Load
Waterheat Load Only
KILOWATTS
Control Period
Chart No.4
A.M.
NOON
P.M.
DATE 7-19-38 DAY Tuesday

Chart No. 4

incremental business which cannot financially support itself, and it would obviously be unsound policy to spend money in promoting the sale of water heating service if such service does not contribute to the general support of the entire capital structure of the utility.

It is a generally accepted principle that the total cost of hot water service, including both utility and customer investments, approximates a constant for a given supply of hot water. The nearer the service approaches instantaneous heating with small tanks and high wattages, the more the investment cost is shifted from the customer to the utility. This, of course, means higher operating costs and rates, and is an important reason for favoring storage service with larger tanks and low wattage elements. The question resolves itself into a comparison of ultimate cost to the customer; and while the customer's initial investment may be somewhat greater where larger double-unit tanks are required, his operating cost is correspondingly lower for each of the years of his service. Electric water heating is in a difficult class of competition, and a rate which will obtain the business cannot be offered unless the cost to the utility of added investment required to supply such service is kept to a minimum. As a matter of fact, this Company's experience does not indicate that the cost of water heating equipment has to any material extent held back water heater sales, for, as stated above, during the past four years, an average of more than 4½% of the total number of residential customers on the Company's system have, each year, purchased water heaters which in all respects comply with the specifications set forth in the Company's Schedule No. 1 above referred to. The sale of electric water heating service and electric water heaters, like anything else, depends upon aggressive sales activity. This Company's experience in water heating campaigns has been that *the prospective customer is far more interested in the cost of the service than he is in the initial price of the equipment*, which again supports the proposition that the Company's added investment for supplying water heating service should be kept at a minimum in order that the rate for supplying such service may likewise be kept as low as possible.

There is no question that electric water heating service must be sold at 1c per kwhr or less, if it is to compete with other forms of fuel and thus have wide acceptance. The problem thus is one of furnishing very low cost kilowatthours. In the fixing of rates for any class of service, four expense factors, among others, must be given consideration, namely (1) the expense of billing, collecting and accounting; (2) such miscellaneous expenses as the answering of complaints, customer premises expenses, etc.; (3) the carrying charge on the investment and equipment required to render the service; and (4) the incremental cost of plant operation. If any of the above factors can be reduced or eliminated, in the furnishing of electric water heating service, an economic basis is provided for supplying kilowatthours for such service at a lower cost than for other classes of residential use. A brief analysis of the first two items, however, will indicate that while there may be some reduction in the amount of these costs which apply solely to incremental water heating service, as compared with similar unit costs of supplying the balance of the residential load, such reductions would not be large in the aggregate and would offer little, if any, basis for a material reduction in the rate offered for the water heating portion of the residential load.

The two remaining components of the cost to serve water heating are the carrying charges on the investment required, and the incremental cost of operating the system. The incremental cost is not fixed, being largely dependent on the load factor of the equipment; and, accordingly, the last two items mentioned above are inter-related and must be considered together. To evaluate these factors in terms of cost, it is necessary to determine both demands and load factors not only of the water heaters alone, but of the combined water heaters and other domestic load.

Although water heaters of various tank sizes and heater combinations are in use, a study of this kind can be undertaken by considering only those sizes most generally in use. In the absence of separate metering, it is impossible to determine the average kilowatt hour use per electric water heater on the Company's system, having as it does a 24% saturation of water heater installations, which includes a substantial percentage of installations in middle income group families, whose use of hot water is proportionately lower as our experience has shown. Various studies, however, have indicated that 250 kwhr per month, or 8.3 kwhr per day is a reasonable average, although in actual practice individual daily consumption may run as high as 50% over the average, or 12.5 kwhr on some days.

On the basis of the above average, the hours of use per day for water heating, and resultant load factors, may be summarized as follows:

	Kwhr per day	*600 Watts* Hrs.	L.F.%	*1000 Watts* Hrs.	L.F.%	*2000 Watts* Hrs.	L.F.%	*3000 Watts* Hrs.	L.F.%
Average	8.33	13.9	58	8.3	35	4.16	17	2.7	11
Maximum	12.49	20.8	87	12.5	52	6.2	26	4.2	18

As a basis of comparison with the above figures, it is important to note that the annual load factor of the Idaho Power Company's interconnected system is approximately 47%, and system service is sold at an average over-all rate of $.0208 per kwhr. The foregoing tabulation, of course, covers water heaters only, and does not reflect the result of the combined water heat and other domestic load. It does indicate, however, that low heater wattages must be used to obtain load factors comparable with those obtained in other Company business.

The effect upon system demands of water heating service when added to other domestic load is not susceptible to engineering calculation inasmuch as the results are largely dependent upon personal and family habits. Data must be obtained by actual field tests, and numerous such tests have been carried on for years by Idaho Power Company and other utilities over the country. While there has been some variance in results due to different water temperatures, personal habits and the like, all such tests point to the fundamental result that high wattages invariably result in low load factors for the system.

Many previous tests have been made by Idaho Power Company on its system, all of which have established the desirability of small wattage heaters which will minimize the additional demand created upon the system. During the past three or four years, various studies have been made for the purpose of ascertaining the correct ratio of heating element capacity to storage tank size, all of which tests have indicated that two heating elements are desirable, and that the bottom element should be of lesser capacity, so as to obtain reasonable use of water heating kilowatt hours during the night valley of the load curve between 10 p. m. and 7 a. m.

A further test, however, was conducted over a period of approximately two months during 1939. For this test a group of eighteen typical customers was selected in Boise, Idaho, all of whom had ranges, refrigerators and small appliances. Nine of these customers had water heaters, giving a saturation of 50%. A separate secondary was run to serve the water heating load so that it might be metered separately, and a recording demand meter was connected to this secondary. A second recording demand meter was connected to the regular secondary to show the range, appliance and lighting demand; and a third meter was installed to indicate the total load.

As one of the principal functions of the test was to demonstrate the relative effects of different sized heaters upon peak demands and load factor, it was necessary to devise a method whereby the wattage of the heaters involved in the test could be varied without disturbance to our customers. In order to accomplish this purpose, two 1000-watt heaters were installed on all tanks. All heaters were of the two-unit type, with interconnecting thermostats, and with carrier control on the lower unit only. A special bucking and boosting transformer was installed on the water heat secondary so that by regulating the voltage of this secondary, the wattage of both units of the heaters could be controlled from 600 to 3,000 at will. For the 3,000-watt uncontrolled test, the base unit only was used at 3,000 watts capacity.

It was, of course, impossible to duplicate exactly during each week the conditions in each home for the several weeks required to complete the test. This is reflected in a slight variation in the demand set up by the ranges and appliances during different weeks, but, regardless of such variation, the trends shown by the test are definite and positive. Attached as an appendix to this report will be found a complete table of the test data, together with photostats of the demand curves as determined from the recording demand meters.

The most important results obtained from the test are shown in the following tabulation which gives the diversified demands and load factors at the distribution transformer for the nine domestic customers having ranges, lights, refrigerators, appliances and water heaters. All data are based upon a test period of one week:

Heater Wattage	*Operating Condition*	*Lighting, Range and Appliance*		*Water Heater*		*Total*	
		Demand	*L.F.%*	*Demand*	*L.F.%*	*Demand*	*L.F.%*
3000	No control	1.05	27.6	2.20	22.1	2.33	31.4
2000	Controlled	1.08	25.2	1.84	19.2	1.96	31.5
2000	No control	1.13	23.6	1.58	26.1	1.61	42.5
1000	Controlled	.90	30.8	1.02	41.3	1.52	48.8
1000	No control	1.18	23.2	.94	44.7	1.61	42.8
600	Controlled	.96	31.4	.60	53.2	1.14	54.3
600	No control	1.12	27.2	.60	51.2	1.63	37.7

As indicated in the above tabulation, no 3,000-watt control tests were run, which was for the reason that the distribution transformer could not withstand the extremely high peak which would be created when the heater was returned to service. It may be taken as established that control of high wattage heaters is detrimental on both demand and load factor.

In analyzing the results of the test, the demands and load factors established by the range, appliance and lighting loads will be considered. While there were small variations from week to week, the entire period of test, seven weeks, indicated an average demand per customer of 1.06 kw, with a load factor of 27%.

On the 3,000-watt uncontrolled test, the demand was increased 121% over the lighting, appliance and range load, while the load factor increased only 3.8%.

The 2,000-watt heater under controlled conditions operated about the same as the 3,000-watt uncontrolled heater, and the test definitely showed the detrimental effect of controlling high wattage heaters. The 2,000-watt heater without control showed some improvement, and the addition of the water heater load increased the demand 42% and the load factor 19%. The 1,000-watt heater under controlled conditions gave a resultant load factor of 48.8%. The improvement to load factor was, therefore, 18%, but at the expense of an increase of 68% in demand. Without control, the load factor increased 20% and the demand increased 36%.

With the 600-watt heater, without control, the demand was increased 45% and the load factor 11%. Under controlled conditions, the demand was increased only by 19%, and the load factor increased 23%.

It is evident from the results of this test that the controlled 600-watt heater gives by far the best results. It provided the lowest demand, of .6 kw, as compared with a demand of 2.2 kw from the 3,000-watt uncontrolled unit. The total demand per customer when the 600-watt controlled heater was in use was 1.14 kw as compared with 2.33 kw with the 3,000-watt uncontrolled heater.

One of the most interesting results of the study is apparent from the last column of the tabulation which shows the total load factor per customer. It will be noted that with a 600-watt controlled unit, the customer had an over-all load factor of 54.3%, while with the 3,000-watt uncontrolled heater, the over-all load factor was 31.4%. The addition of the water heating load improved the customer's load factor from 27.6% to 31.4%, or an increase of only 3.8% when 3,000-watt heaters without control were used, while the customer's load factor was improved from 31.4% to 54.3%, an increase of 22.9%, when 600-watt controlled water heaters were used. We believe that the customer who installs the type of heater which makes it possible for him to make use of our equipment and facilities required to serve him 22.9% of the time more than a customer who installs another type of heater is entitled to a discount for service used by such equipment. It was further demonstrated that the addition of a 600-watt controlled water heater to the range and appliance load will allow almost double the kilowatthour consumption by the customer with only a 19% increase in demand. And it is the existence of such conditions which justifies the low water heating rate which must be offered if the service is to have a wide acceptance.

It is noteworthy that the above test data were obtained under city conditions, with a large group of customers being served from one transformer. Accordingly, the test was based upon conditions more favorable to the use of high wattage heaters than generally exists upon the Company's system. Since a large proportion of our domestic business is supplied from 3, 5 and 7½ kw transformers, each serving from 1 to 4 customers, the more serious effect of using the high wattage heaters under average system conditions will readily be appreciated.

The 1939 test was carried only to the

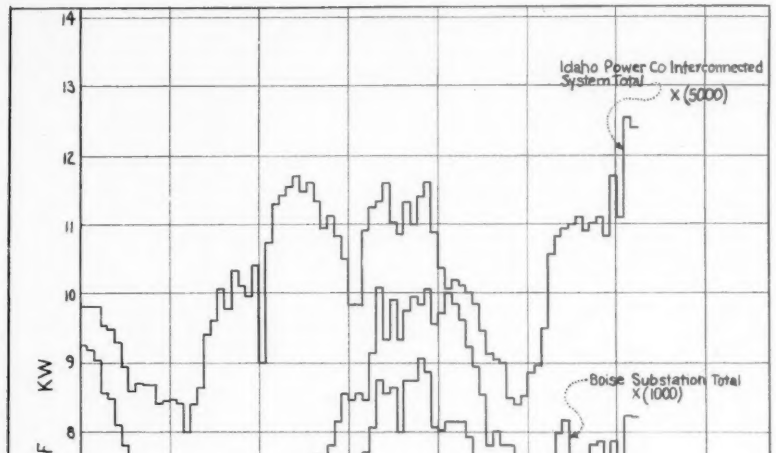


Chart No. 5

Idaho Power Company Electric Water Heating Tests. Chart showing relation of peak demand of various sub-stations to system total.

distribution transformers, the plant items affected being the transformers, secondaries, services and meters. However, as the Company's domestic feeders carry practically no other than residential load, the primary lines are involved and affected to the same extent as the transformers.

In order to translate the above data in terms of effect upon substation and power production facilities, a further study was made, the results of which are summarized in the three Charts 5, 6 and 7.

On Chart 5, the upper curve shows the average weekly demand on the Company's interconnected system from January, 1938, to August, 1939. The second curve shows the average weekly total load of the Boise substation. The third curve gives the same information for the Twin Falls substation; and the fourth curve shows the average weekly load of the seven domestic feeders only, at the Boise substation. From these curves it is apparent that the substation curves follow the domestic load curves, and that the system curve follows the substation curves. Accordingly, the domestic load is reflected through distribution, substation and transmission facilities to the power plants with little diversity from commercial and industrial loads.

Approximately 1,425 water heaters served from the Boise substation are under carrier current control. These heaters may be turned off or on at will, and an ideal method of observing the water heat load is thus available.

Chart 6 shows the results of such a test. The top of the curve is the total domestic load (Boise substation) for 9,200 customers. The shaded area shows the demand of 1,425 water heaters of .9 kw average connected load, operating without control. The resulting addition to total substation demand is apparent.

Chart 7 shows the average diversified demands (Boise substation) over a period of five weeks of the 1,425 heaters above referred to. The chart is set up on a "per heater" basis, and shows a unit demand of approximately .48 kw at the time of noon and evening peaks. On this basis, 48/90ths, or 53.3% of the connected heater load is reflected on the substation under conditions of no control. The curve shows the total demand of both base and booster units. It is reasonable to assume that not more than 10% of the booster units would be working at any given time, and this being true, we can expect that 9/10ths of .48 kw, or .43 kw per heater, will be eliminated from the peak by control.

As heretofore stated, the above test was made with heaters whose average capacity was .9 kw. If 600-watt heaters were used, 50% more time would be required to heat a given amount of water than was the case with the 900-watt heaters. Accordingly, with 600-watt heaters, it can reasonably be expected that the percentage of heater capacity reflected back to the substation (53.3% in the case of .9 kw heaters) will be increased by approximately one-half, or to 79.9%, which, applied to 600 watts, would result in 479 watts (.479 kw) per heater diversified demand at the substation. And it is reasonable to assume that 65% of the 479 watts per heater

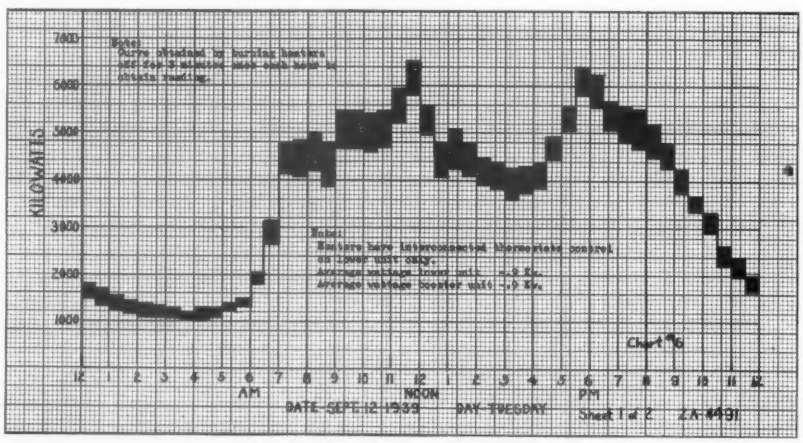


Chart No. 6

Idaho Power Company Water Heating Tests. Chart showing relation of water heater load to total domestic load. 9200 customers, 1600 water heaters. Shaded areas is water heat load. Lower unshaded area is other domestic load.

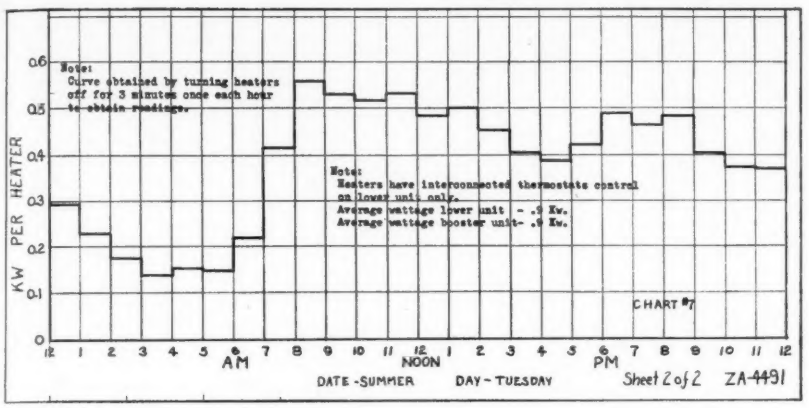


Chart No. 7

Idaho Power Company Water Heating Tests. Chart showing average Kw demand per customer of water heater load on Tuesdays, June 13-July 11, 1939, incl. (1425 controlled units).

of demand, or 311 watts (.311 kw) will be reflected back to the power plants.

There are, at present, two general methods of water heat control that are suitable for conditions on the Idaho Power Company system, namely—carrier current control, and the use of time switches. As to the former, an analysis of the Boise substation installation, whereby approximately 1,425 heaters are controlled by carrier current, indicates the following unit costs:

Relay	$19.14
Installation	3.34
Substation equipment	2.00
Total per installation	$24.48

On the basis of saving 479 watts demand per heater at the substation, the cost per kw in control would be:

$$\frac{\$24.48}{.479} = \$51.10 \text{ per kw}$$

The other method of control is by use of time switches. One company offers a high quality switch for approximately $10. The cost per installation with this equipment would be:

Relay	$10.00
Installation	3.34
	$13.34

On the basis of saving 479 watts per heater at the substation the cost per kw in control would be:

$$\frac{\$13.34}{.479} = \$27.84 \text{ per kw}$$

Controlling water heating, at the above costs, may be justified as follows, assuming—

Investment in Production and Transmission on a system diversified basis = $225 per kw.

Sixty-five per cent of substation water-heating demand would be reflected in general system demand.

65% of $225 per kw	$146.00 per kw
Substation Investment	25.00 per kw
Distribution Investment	75.00 per kw
Total	$246.00 per kw

Carrier current control, although more expensive in the initial installation, offers several advantages over individual unit control by means of time switches. Its use is limited, however, to a few of the larger towns such as Boise, Twin Falls, Pocatello, and possibly Ontario, Oregon, for the reason that the required substation equipment cannot as yet be economically obtained in small sizes.

Up to the present time the Company's water heater control, except for experimental and test purposes, is limited to the use of carrier current operated from the Boise substation, and controlling some 1,425 heaters in the Boise territory. This was installed beginning some four years ago, the original installation covering only approximately 500 heaters. Additional installations were added from time to time, the last being in 1938. Control in other localities has not been effected for two reasons—first, because the Company has desired to observe fully the results of control in the Boise area before making the required additional investment to effect control elsewhere; and second, because, as yet, there is remaining distribution capacity in those locations where carrier current control is economically feasible. Where such surplus capacity is exhausted, two courses are open, namely—to provide additional distribution, substation and other plant capacity, *or* to reduce the demand on the distribution system by off-peak control of the water heating load. The latter method has a double advantage—in that it not only delays the time when investment in general system capacity need be made, but also decreases the amount of investment required in distribution and substation facilities. It thus accomplishes a two-fold purpose, and results in a permanent decrease in the amount of investment in fixed capital which is eventually required. In other words, for a maximum investment of $51.10 in facilities for water heater control, approximately 1 kw of demand can be eliminated from substation and distribution peaks, which could otherwise be provided for only by a permanent investment in fixed capital of not less than $256 (per kw), which figure is believed to be conservatively low.

Assuming that a materially higher saturation of water heating is reached on the Idaho Power Company system within the next few years, the problem of system demand required to serve the water heater load is one which can become extremely serious. In Appendix I the tabulations involving 18 customers, as shown on the various charts, provide information regarding the demands which may be expected per average customer (with 50% water heating saturation for the various sizes of heating units tested). It is interesting to note that the highest demand per customer was established when the uncontrolled 3,000-watt single heating unit was used (Appendix I, Chart A), the demand being 1.69 kw per average customer. With the same 50% saturation of controlled 600-watt double element heaters (Appendix I, Chart F), the demand per customer was only 1.05 kw, or a difference of .64 kw per customer served under conditions of 50% water heating saturation.

It is not unreasonable to assume that in another ten years Idaho Power Company will be serving 60,000 residential customers (the number being 52,000 at the present time), and that approximately two-thirds of them or 40,000 will be served from substations where carrier current control would be feasible. On the basis of .64 kw saving in demand per customer, control may well be expected to result in a total decrease in demand of (40,000 × .64 kw) 25,600 kw of distribution and substation capacity, a major portion of which would be reflected back through the transmission system to the power plants. The resulting decrease in investment and fixed charges would very materially re-

APPENDIX I

Idaho Power Company Electric Water Heating Tests (50% Saturation)

SUMMARY OF TEST DATA SHOWING EFFECT OF HEATER SIZE ON DEMAND AND LOAD FACTOR PER CUSTOMER, MEASURED AT DISTRIBUTION TRANSFORMER

		Lighting, Range and Appliances			*Water Heater*			*Total*		
		Demand	*L.F.%*	*Kwhr*	*Demand*	*L.F.%*	*Kwhr*	*Demand*	*L.F.%*	*Kwhr*
600	No Control	1.12	27	51	.30	51	26	1.38	33	77
	Controlled	.96	34	50	.30	52	27	1.05	43	77
1000	No Control	1.2	23	46	.47	45	35	1.39	34	81
	Controlled	.9	35	53	.51	41	36	1.21	44	89
2000	No Control	1.13	24	45	.79	26	35	1.37	34	80
	Controlled	1.08	25	46	.92	19	29	1.52	31	75
3000	No Control	1.05	28	49	1.10	22	41	1.69	31	90
	Average	1.06	27.27	48.57						

IDAHO POWER COMPANY
Electric Water Heating Test

Chart A

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 3000 Watt Heating Unit Uncontrolled

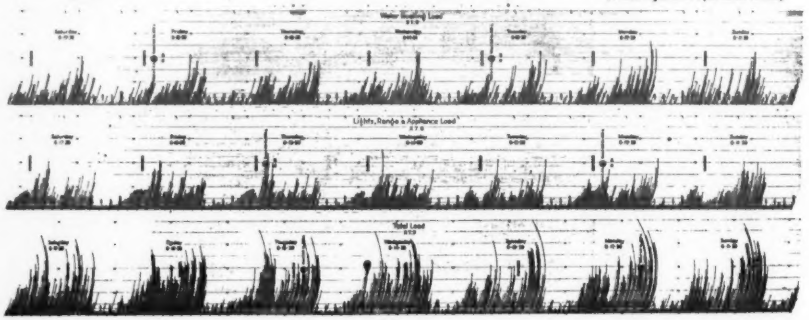
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.05 KW	2.20 KW	2.33 KW
Weekly Load Factor	27.59%	22.12%	33.4%
Weekly KWH per Customer	49 KWH	82 KWH	131 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.05 KW	2.20 KW*	1.69 KW
Weekly Load Factor	27.59%	22.12%	31.37%
Weekly KWH per Customer	49 KWH	82 KWH*	90 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart B

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 2000 Watt Heating Units Controlled

Heaters are of Two Unit Type with Interconnected Thermostats. Control on Lower Unit Only. Maximum Possible Demand Per Tank 2000 Watts

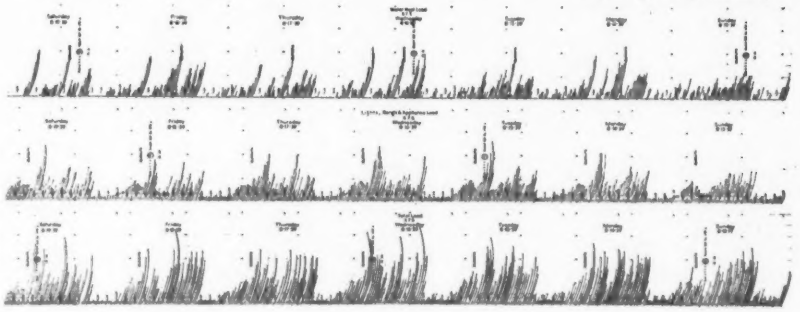
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.08 KW	1.84 KW	1.96 KW
Weekly Load Factor	25.2%	19.2%	31.5%
Weekly KWH per Customer	46 KWH	58 KWH	104 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.08 KW	1.84 KW*	1.52 KW
Weekly Load Factor	25.2%	19.2%	31.5%
Weekly KWH per Customer	46 KWH	58 KWH*	75 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart C

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 2000 Watt Heating Units Uncontrolled

Heaters are of Two Unit Type with Interconnected Thermostats. Maximum Possible Demand Per Tank 2000 Watts

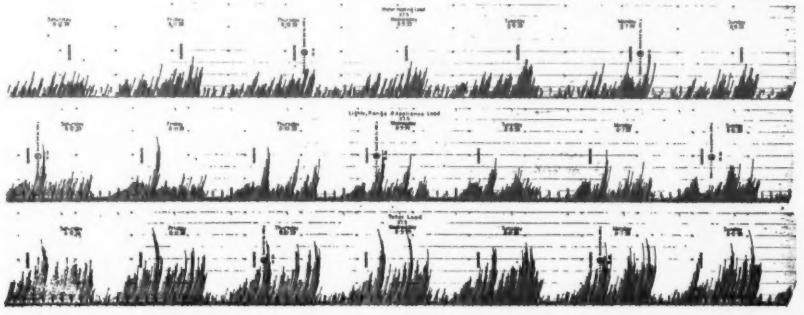
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.13 KW	1.58 KW	1.61 KW
Weekly Load Factor	23.6%	26.1%	42.5%
Weekly KWH per Customer	45 KWH	70 KWH	115 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.13 KW	1.58 KW*	1.37 KW
Weekly Load Factor	23.6%	26.1%	34.5%
Weekly KWH per Customer	45 KWH	70 KWH*	80 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart D

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 1000 Watt Heating Units Controlled

Heaters are of Two Unit Type with Interconnected Thermostats. Control on Lower Unit Only. Maximum Possible Demand Per Tank 1000 Watts

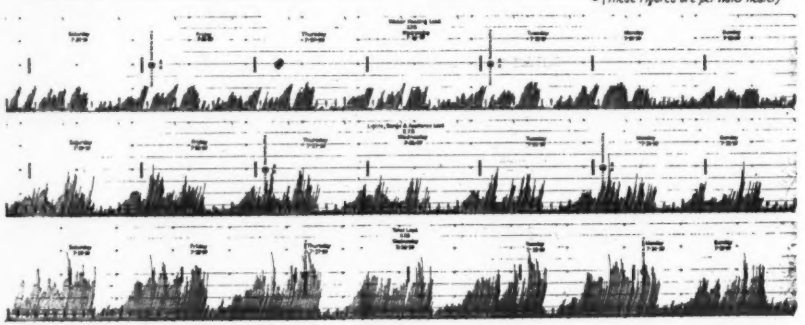
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	.90 KW	1.02 KW	1.52 KW
Weekly Load Factor	30.8%	41.3%	48.8%
Weekly KWH per Customer	53 KWH	72 KWH	125 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	.90 KW	1.02 KW *	1.21 KW
Weekly Load Factor	30.8%	41.3%	44.0%
Weekly KWH per Customer	53 KWH	72 KWH *	89 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart E

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 1000 Watt Heating Units Uncontrolled

Heaters are of Two Unit Type with Interconnected Thermostats. Maximum Possible Demand Per Tank 1000 Watts

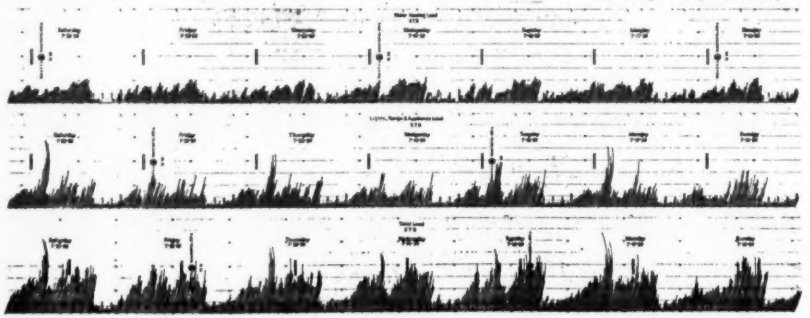
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.18 KW	.94 KW	1.61 KW
Weekly Load Factor	23.2%	44.7%	42.8%
Weekly KWH per Customer	46 KWH	70 KWH	116 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.18 KW	.94 KW *	1.39 KW
Weekly Load Factor	23.2%	44.7%	34.5%
Weekly KWH per Customer	46 KWH	70 KWH *	81 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart F

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 600 Watt Heating Units Controlled

Heaters are of Two Unit Type with Interconnected Thermostats. Control on Lower Unit Only. Maximum Possible Demand Per Tank 600 Watts

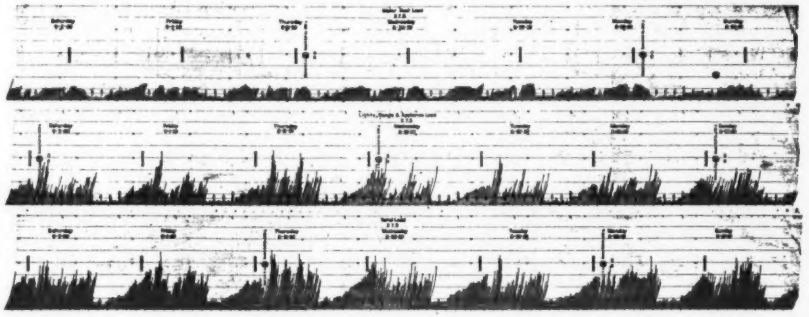
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	.96 KW	.60 KW	1.14 KW
Weekly Load Factor	31.4%	53.2%	54.3%
Weekly KWH per Customer	50 KWH	54 KWH	104 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	.96 KW	.60 KW *	1.05 KW
Weekly Load Factor	31.4%	53.2%	43.5%
Weekly KWH per Customer	50 KWH	54 KWH *	77 KWH

* (These Figures are per Water Heater)



IDAHO POWER COMPANY
Electric Water Heating Test

Chart G

To Determine Demand and Load Factors with Various Sized Heater Units. Charts show Diversified Demand for 18 Customers with Electric Ranges, Refrigeration, Appliances and Lighting. Nine of these Eighteen have Electric Water Heaters of 30 gallon Capacity, giving a Saturation of 50%

Conditions of this Test: 600 Watt Heating Units Uncontrolled

Heaters are of Two Unit Type with Interconnected Thermostats. Maximum Possible Demand Per Tank 600 Watts

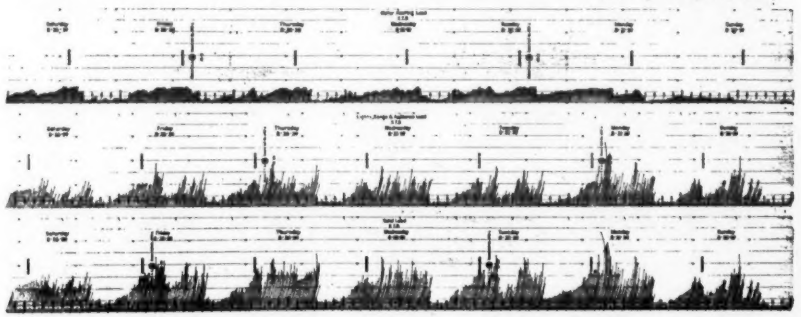
Data for Nine Customers with Electric Water Heaters

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.12 KW	.60 KW	1.63 KW
Weekly Load Factor	27.2%	51.2%	37.7%
Weekly KWH per Customer	51 KWH	52 KWH	103 KWH

Data for Entire Group of Eighteen Customers

	Range & Appl.	Water Heat	Total
Weekly Demand per Customer	1.12 KW	.60 KW *	1.38 KW
Weekly Load Factor	27.2%	51.2%	33.2%
Weekly KWH per Customer	51 KWH	52 KWH *	77 KWH

* (These Figures are per Water Heater)



duce the cost which would have to be allocated against the water heating load, and therefore would reasonably justify a proportionately lower rate for water heating service than could otherwise economically be justified.

Idaho Power Company was one of the first pioneers in developing the water heater field. Its aggressive policy, adopted years ago, has never been changed. At the present time the Company's water heater saturation is one of the highest in the west and in the United States. It is not unreasonable to suppose that this saturation can be brought to approximately 50% within another ten years. To accomplish such an objective should not be difficult, provided two conditions are met:

1. The service rate must be kept as low as possible, so that operating costs will be low enough to meet competitive forms of water heating service; and

2. The Company must feel free to promote electric water heating aggressively at the above low rates, without the possible danger that water heating service will create a serious peaking problem that can only be avoided by additional investment made specifically for water heating service.

The only alternatives are to subsidize water heating rates at the expense of other classes of service, or make the added investment and then charge a water heating rate sufficient to justify the investment required. Neither alternative is desirable, and both are unnecessary if water heating installations are so designed and controlled as not to create unnecessary high demands at peak periods, and at the same time to utilize off-peak kilowatthours, thus providing a load factor that is comparable with load factor on the system generally. This is the Company's present practice, and has been in effect for years, as a result of gradual experience. That it is accomplishing its purposes is evidenced by the studies which are reviewed in this paper. And that it is practical from the consumer standpoint is evidenced by the Company's water heating record which is outstanding in the United States.

MKB Contests of Real Value to Utilities

THE Modern Kitchen Bureau's Electric Water Heater Program for the Spring of 1941 features three contests for utility new business men. Prizes totaling $2,000 will be awarded to winners.

These contests have proved highly successful in the past, both in maintaining the enthusiasm of sales organizations over long periods and in increasing sales, by offering direct cash awards for merchandising and display ability.

$1,000 will be awarded, in $500, $300 and $200 prizes, to the utilities doing the best all-around promotional and sales work on electric water heaters during the entire year. Any operating company in the United States is eligible. The size of the company, amount of money appropriated, etc., are immaterial. The excellence and execution of the plan, percentage of sales increase, dealer cooperation and number of water heaters sold per 1,000 domestic customers will count most heavily in determining the winners.

By stressing dealer cooperation, this contest encourages utilities to spur the activity of dealers and to work closely with them in all phases of the promotion—a healthy condition, as the dealers continue to sell increasing numbers of water heaters.

The Window Display Contest, open to any water heater retailer, will divide $500 equally as Spring and Fall awards. Here again, dealer activity can be increased by this contest, as many utilities conduct local contests among their dealers, award small prizes for the best displays and enter the winners in the national contest.

The Floor Demonstration Contest, a new national contest, is exactly like the Window Display Contest, but is based upon demonstration displays inside the store.

Simple, inexpensive displays have the same opportunity to win as do elaborate ones. The effectiveness of the displays in stopping passers-by and dramatizing the advantages of electric water heaters are most important.

Water Heater Radio Programs

The recording of 16 one-minute radio programs, which dramatize the selling points of electric water heating and the inconveniences of old-fashioned methods, has been enthusiastically received by those utility men who have already heard it played.

These programs, employing smart, modern sales techniques, are a new departure in water heater merchandising. Utilities have been slow, generally speaking, to take to the air in promoting their services. Now, with ready-made programs that allow plenty of time for copy that sells the individual brands, it is expected that this medium will prove just as effective for electric companies as it has for other industries.

With sixteen of these programs to use, utilities will spot them at different times during the day and evening.

The price of the recording is only $2.50, a fraction of the production cost, in order to insure widespread use.

Motor Vehicle Conference at Pittsburgh, in April

A MOTOR Vehicle Conference for utility companies will be held April 21 and 22, 1941, at the William Penn Hotel in Pittsburgh, Pa., in conjunction with the Distribution Conference of the American Gas Association. The AGA Committee on Operation of Public Utility Motor Vehicles is sponsoring the Vehicle Conference with the cooperation of the Society of Automotive Engineers and the Edison Electric Institute. Four sessions have been planned for the two-day program; in addition, the Vehicle Conference and the AGA Distribution Conference will hold a joint luncheon Monday noon.

At the first session, beginning at 10 a.m. on Monday, April 21, the subject will be "Application of Motor Transportation to the Gas Industry." A. C. Cherry, Cincinnati Gas and Electric Company, will speak on the operator's viewpoint and John M. Orr, assistant to the president, Philadelphia Company, will represent the transportation supervisor. Open discussion from the floor will conclude the symposium. R. H. Clark will preside.

E. P. Durfee, assistant manager of the insurance department, Consolidated Edison Company of New York, Inc., will be the principal speaker at the Monday luncheon session; his subject, "Public Utilities in National Defense."

"Shop Methods for Improving Gasoline Economy" will be discussed by Errol J. Gay, Ethyl Corporation, at the Monday afternoon meeting, opening at 2:30. His address will be followed by open discussion if time permits. At 4 p.m. the AGA Committee on Operation of Public Utility Motor Vehicles will hold its meeting.

B. D. Connor, in charge of motor transportation for Boston Consolidated Gas Company, will preside at the Tuesday morning session. N. P. Larson, vice-president, Truck Engineering Company, will speak on "The Development of Body Design for Meter Setters' Trucks—Both Gas and Electric." Further discussion on this subject will be contributed by representatives of other commercial truck manufacturers.

The final session, beginning at 2 o'clock Tuesday afternoon, will be a closed meeting for public utility motor fleet operators only. Jean Y. Ray, Virginia Electric and Power Company, will preside.

"They're Buying Beer in Bridgeport"

By Harold F. Smiddy
Chief Operating Sponsor, Ebasco Services Inc., New York.

A talk before the 13th annual Central Station Sales Conference sponsored by G-E Institute, Bridgeport, Jan. 2-3

IN the latter part of November, my eye was caught by a small news article in a N. Y. newspaper which was captioned "Laborers Buy Champagne in Bridgeport Wage Boom." Some of the significant sentences from that article read as follows:

"Factory workers who are earning wages reminiscent of World War boom days, have developed such a taste for champagne that sales have increased 300 per cent . . . ."

"Liquor store owners said that the 300 per cent rise . . . was due almost entirely to purchases by laborers. One store owner said that a customer who usually bought a dozen bottles of beer each weekend walked in last Saturday and bought three bottles of champagne. 'My girl friend has high-class tastes and she wants champagne just like they have in the movies,' he said . . . ."

This visit to Bridgeport has been too short, as yet, to make any personal survey of the liquor prices locally, but as a matter of curiosity it may be worthwhile to do a little figuring. Suppose our laborer friend has been able to purchase his twelve bottles of beer per week at 12 cents per bottle, including a dime for the beer and 2 cents for the bottle. On that basis his weekly budget for beer was $1.44 gross. Just what kind of champagne he may have selected is a little more of a gamble, but let's assume that he paid $6.50 per bottle. On that basis three bottles would be $19.50 per week, or an increase at the rate of about 1250 per cent.

A check-up with the local utility company here indicates that at the present time its residential kilowatt-hour sales per customer per year are running about 9½ per cent over the previous year. In other words, the customers are buying champagne in the liquor stores, but in our electric business *they are still buying beer in Bridgeport!*

Now just to get the record clear, so that this may never be construed to reflect adversely or critically upon the sales progress of the local utility company, let me say that it is doing a definitely better-than-average job and certainly better than many companies with which I am associated. In other words, the customers are not only "buying beer" in Bridgeport in the electric utility business, but they seem to be "buying beer" pretty much all over the country in that business. It would appear worthwhile, therefore, to try to see what basic sales lessons may be learned from the little clipping about liquor sales in Bridgeport.

Perhaps there are two such lessons which are worthy of further discussion at this conference, as follows:

First, competition for the customer's dollar will be keener than ever in 1941, just when higher taxes and higher costs generally will make the need for increased net utility revenues greater than ever before; so that sound successful sales efforts will be doubly essential from a business standpoint in 1941; and

Second, as the reported sales of champagne show, people will buy a Product or Service when it has some *fundamental Sales Appeal;* so that the job of the Electric Industry sales staffs for 1941 is to show their own customers that electrical products and services have such powerful and moving Sales Appeals as to cause those customers to take Buying Action in satisfactory volume.

Certainly, therefore, the sales job which is still ahead in the trying year which we all face, is big enough to demand, and to deserve, the coordinated efforts of all branches of this great American electrical industry. And that sales job is big enough so that there is a place in carrying it out for *every* branch of that great industry. The manufacturer-wholesaler-dealer-contractor group can sell, make and install an increasing volume of appliances and wiring. The utility group can sell, produce and deliver electric service to operate such appliances. And finally, the trade press can play a wonderfully constructive part to the extent that its endeavors continue to be directed, as heretofore, toward knitting the efforts of all branches of the electrical industry together, and toward combating any tendencies which might tend to pry the various component industry-groups apart.

It is not a new theme, of course, to plead for *continued coordinated and cooperative Electrical Selling.* But the subject is still so important, especially for such an unusual year as 1941, as to deserve a simple restatement of some of the fundamental bases for bringing about such coordinated and cooperative sales activities. Such fundamental bases could, perhaps, be summed up concisely in the following five statements—

1. It must be recognized by all concerned that individual branches of the industry have *both* spheres of common commercial interest *and* spheres of genuine differences of commercial interest, with respect to each other.
2. Cooperation can best come from defining the basic and very considerable areas of agreement, and widening them, so as to facilitate mutual progress.
3. Only conflict can come from intra-industry stressing of, and pecking at, genuine and proper differences of viewpoint and objectives of component industry-groups, with the inevitable result of tearing each other down with ultimate profit to nobody.
4. The most hopeful field for agreement and common effort arises from the fact that the same truly fundamental Sales Appeals attach to the *Use* of practically all electrical appliances; recognizing, however, that such *Use* of those appliances involves *both* the appliances themselves *and* the electrical service to operate them, if they are to function so the customer may actually receive the basic benefits which they make possible.
5. In the discovery and skilled promotion of such common and fundamental Sales Appeals, therefore, is to be found solid common ground for productive joint sales efforts between all of the various branches of our great Electrical Industry.

In attempting to apply the principles just stated, perhaps the next point to be made is that the first job of each electrical Sales Manager in 1941—whether he be paid primarily to sell electric service or to sell electric equipment—is to know the Basic Customer Benefits which should result from his sales efforts. Now this profound conclusion isn't new either, but possibly a little story will bring an old truth back to mind and lend it new and necessary emphasis. The story, printed in the August 1940 issue of the *National Furniture Review* is about the little old lady who went to a hardware store to buy a stove:

"She was interested in a stove, in fact she wanted to buy a stove, and told the furniture store salesman that is why she was in the store. She listened very patiently and meekly to the sales patter. She heard about non-corroding bolts, and patented insulation material and the gauge of steel used, and tricky controls, and over-size combustion chambers, and all the other things that are so startlingly new in an old lady's world that you'd think they would impress her mightily.

"Finally the salesman paused, and she still waited with patient expectancy.

" 'Well, madam, I've told you everything

about the stove,' the salesman declared, 'Is there anything else you'd like to know?'

"'Yes,' she answered, 'Will it keep an old lady warm?'"

So that really all the customer wanted to know is *what Basic Benefit* would come to her as a result of *Using* that which she proposed to purchase!

Now, suppose that that stove was an electrical device the use of which you gentlemen were interested in promoting. The Basic Benefits of the kind which the little old lady had in mind could come to her from using a Blank Electrical Manufacturing Company's stove and anybody's kilowatt-hours; or they could come to her from using the Blank Power and Light Company's kilowatt-hours and anybody's stove.

The *ultimate Sales Appeal* would be the same, therefore, regardless of what particular electrical manufacturer or what particular utility was interested in getting that stove sold, energized, and used. In this respect at least the sales promotion staffs of the Blank Electrical Manufacturing Company and of the Blank Power and Light Company would be aiming at an identical, ultimate goal, which would be, very simply, to "keep the old lady warm."

Such basic Sales Appeals consequently afford a series of common themes around which both equipment and utility interests can build their story to the public so as to get the greatest cumulative effect. Yet each can also supplement such themes in its own way—the one by urging the reasons which should cause the little old lady to purchase its particular appliance—the other by stressing such points as will help to make the little old lady appreciate the Value, Cheapness, and Usefulness of its particular utility service and kilowatt-hours.

So there is a basis for truly coordinated Selling to which every one can give most earnest and whole-hearted support in 1941. And certainly the need was never greater than it is in 1941 for business men to pool their efforts so as to make their fundamentally constructive business functions better understood by the whole public; and thus to secure much wider public appreciation that the American Standard of Living, which is so deeply threatened right now, has come from the American system of Business Enterprise.

Remember also, that it is in just such troublous times as 1941 promises to bring forth, that there is the *greatest* need for intelligent sales activities. With so many transient and distracting influences bearing most heavily on public attention, there is supreme need for alert and able sales and promotion men, who can—no matter what the force of the diversions—continue to look forward, and to keep a vigorous, progressive, pioneering attitude prominent in all their efforts.

In many ways this industry is still young in years, and in many ways the pioneering spirit is still rampant within it. Nevertheless, if you analyze your present Sales Budgets open-mindedly, it is quite possible that you will be somewhat surprised to realize how much of your sales time and money is going to promote products or services which are not by any stretch of the imagination really new, or even new uses or applications, and how little is going for the purpose of introducing and pushing genuinely "pioneer" services or uses.

This condition opens up a field for constructive sales managerial thinking. By no means should the old stand-buys be neglected. They are the bone and sinew of the business. But time is working on them and it is never too early to be thinking of new services to fill the gap which would open if any of them, for any reason, should lose some of their appeal as the years go by. You know how modern restaurant service has tended to narrow the market for home cooking. You are equally well posted on how modern laundry service has cut into the market for home washing.

And finally, you know how research progress in your own industries has brought obsolescence of *Use,* of many services. The refrigerator which used around 1000 kilowatt-hours per year in 1922, for example, operates—and operates far *better* from a Food Protection standpoint—on less than half that many kilowatt-hours per year now. You have seen the same progressive trend as to your lighting loads, as to your cooking loads, as to just about *every* kind of load. You know that, as long as the American enterprise system goes on, you may expect the same trends to continue.

Consequently, it is most important for every Sales Manager to realize that combatting Load Mortality of all kinds is one of his most vital functions. And while retention of Business—which it is not proper and *necessary* to lose—is most essential, such defensive sales activities should always be paralleled with offensive sales work aimed at constantly introducing both new and pioneer services and also new uses and longer hour uses for old services; which latter, incidentally, also have a common sphere of interest from their utility and from their manufacturer-jobber-dealer aspects, since such added uses hasten the day when appliance replacements, with their welcome addition to dealer merchandise sales volume, may properly be expected.

But, particularly, it seems worthwhile here and now, to direct greater emphasis to the importance of pioneering *entirely new* services and of constantly promoting better sales programs to show the huge field which is still untouched for added uses of services with which your thousands of customers think they are more familiar than is really the fact.

The point at issue was well made in a recent article by W. H. Conant, entitled "When a Business Is Old," which appeared in *Barron's* for November 18, and from which the following paragraph is quoted:

"New products or services are the best of all youth-restoring serums for business-hardened arteries. Every man, or group, forms a new business around some product, line or special form of service. And the product, line or service is improved, broadened and changed in various ways as the business grows and ages. There comes a time, almost imperceptibly, when the product, line or service doesn't have the Sales Appeal it had at sweet 16. And no amount of modernizing is going to restore its business vigor. A new product should have been coming along in the shade of the sheltering older line, ready to become the debutant new business-getter when profits tell the tale of faltering public demand."

So when you pioneer either new products and services, or when you pioneer new or longer-hour uses of old services, you are doing a real job to keep your industry young and vigorous, and to keep your public service progressive and attractive. When you stress in your 1941 sales programs such Uses of utility electric service as those of the electric blanket, or of home ventilation, of automatic clothes washing, or of the home workshop, you may be doing much more than merely pioneering the new. Indeed, you will be fostering and developing these fundamental things and attitudes that are absolutely essential in the long run in order to keep your business going ahead, to keep it perpetually young, and to keep it pointed towards profitable operation and continued customer confidence. With respect to such new services, there is a marvelous opportunity for coordinated sales work, to discover, to dramatize, and to sell those Basic Benefits of such services which are most likely to be successful in capturing public

attention and thus develop public understanding and appreciation of such Customer Benefits.

It would not be right, however, to talk about your sales problems for 1941, as if it merely were to be one more year for following old fundamentals in the course of more or less "normal" times. On the contrary, you will be endeavoring to carry on your particular activities in the face of extraordinary circumstances, the like of which have never been seen before. Let us take, therefore, just a few more moments and examine whether your proposed efforts are proper and timely in the face of the great emergency which faces us all so strikingly at this time.

First of all, it is appropriate to point out that you are very fortunate to belong to an industry which has so prepared itself heretofore, that it expects to be able to meet the demands for its output in 1941, not only to facilitate National Defense requirements, but also to take care of normal business and normal growth. Electrical manufacturers also are able satisfactorily to meet demand for new generating or other electrical equipment and utilization appliances. It is an inspiring story and a great tribute that our American industrial system has been so built up in fact and in experience.

Indeed, perhaps the best tribute to the manufacturers' position is found in recent newspaper articles, which make clear that if appliance output is impeded at all, it will be entirely because of shortages in basic raw materials and in spite of such extraordinary and foresighted steps—taken months ago by the electrical manufacturers—as early preparation of new designs, early ordering of machine tools, early placement of orders for zinc, aluminum, steel and other materials necessary in their business. And even where delays in delivery of raw materials may arise, it is to be noted that in many cases this condition was also anticipated and new designs prepared to use plastics or other substitutes so that production may not be curtailed.

Representatives of the country's electric utilities likewise belong to a great American Industry which is prepared to do its part well during the trying years just ahead. Edison Electric Institute figures for the latest available month show that the electric utility industry's installed generating capacity is very substantially in excess of current peak loads. Recent analyses have disclosed the fundamental fact that the private utility industry in this country has ample power supply available to meet the Nation's Defense needs. The private utility industry is also prepared with facilities, with manpower, and with money, to provide even greater amounts of power when and where necessary.

The private utilities, therefore, are rendering a public service of major value in the crisis in which the United States finds itself for 1941, by providing an immediately available supply of power to speed up the Nation's Defense preparedness. Such availability of cheap and dependable power now for National Defense needs throughout the nation is due simply to the existence of the vast interconnected private power systems. And these in turn have been planned and built over the last forty years as a result of the increasing common ownership of once-isolated utility operating units by the holding companies of this country.

If you look at the high-tension transmission map of the United States today, you will find no areas where important amounts of power might be needed for National Defense which are not already well served or within very quick serving distance of existing transmission facilities. It is, therefore, definitely worth noting that these great power transmission lines *do* exist primarily because the holding companies brought constantly wider areas under common ultimate ownership and control, without which it had never previously been possible for interconnections of small locally-owned systems to be made complete enough to permit really coordinated operation. The reason for that was simple, too. For without the common ownership and community of interest, as well as the technical and financial resources, which the holding companies made available, local systems developed locally in cramped and narrow style merely because there was no common ownership to help determine such questions as "Who should own what? Who should build what? Who should pay what? Who should buy, or sell, or operat what?" But, as this fine privately-owned electric utility industry *did* develop, these questions were solved, systems were expanded, growth was anticipated in interchange contracts and in system designs, and today the great American Grid is ready to carry the Nation's power loads for its Defense program.

So more than 90% of the total electrical energy sales in the country are made from those great privately-owned electrical systems. In most of the areas where National Defense is of maximum importance, the percentage is even nearer 100%. Without those privately-owned systems to provide the power which is now so vital to the country's welfare, you can imagine for yourselves whether or not the country could meet the National Defense requirements which it has had to face so fast and so unexpectedly.

But because of the existence of such systems, it is pertinent to point out that the Government is free to concentrate its efforts—and its public money—on urgently needed airplanes, tanks, ships, armaments, military training equipment and similar vital National Defense facilities. The provision of these things is a true function of our Federal Government, and one which is occasioning ever-increasing demands from the United States Treasury upon the taxpayers and investors who are its only source of the funds which have thus become so necessary so suddenly.

It should obviously be a source of gratification to us and to our Government alike, therefore, that under these circumstances it is *not* necessary for that Government to spend public money in 1941 for electric power plants, lines or other facilities. As a matter of fact, for purely selfish reasons, if for no better or more constructive ones, it would seem that Government in this country should have no small incentive—considering its enormous need for cash—to nourish rather than to harass a utility industry which while turning the wheels of the Nation's Defense machinery, will pay more than $400,000,000 in taxes to support local, State and Federal governmental activities in 1941.

In examining your fundamental sales position for 1941, you are therefore, as has already been noted, most fortunate that you have a product or service to sell which your companies are prepared to make available for sale in the quantities needed. But even this does not represent the most serious reason for continued, aggressive Selling activities on your part in 1941. On the contrary, the importance—even the vital necessity—of keeping up such sales activities is positive, and goes far beyond any mere negative position that it is not necessary to stop them because of distracting emergency conditions or lack of industry preparedness to be able to keep them going.

This is true because no analytical stu-

dent of the present world situation can possibly avoid the conclusion that, come what may, the impact of War—or of preparation for War—inevitably tends strongly and most powerfully to lower the Standard of Living in every country in which it becomes necessary for the primary efforts of the people to be directed towards military matters and methods of survival. Despite all that may be done, therefore, the Standard of Living stands to suffer as a result of the National and International forces which are now at work. Yet the American Standard of Living cannot be surrendered carelessly or needlessly to any degree, if this is to continue to be the country which we all love. The jealous preservation of that Standard of Living, no matter how great the attacks upon it, is therefore, in and of itself, a matter worthy of the gravest thought and the most intelligent efforts in the year ahead.

It is in this condition that you find, really, the most fundamental reason for keeping your sales efforts on a high plane at this time. For if you examine the reasons which have been responsible for *raising* the Standard of Living in this country, slowly over the years, to a level unparalleled elsewhere in the World in all history, you cannot go far into the subject in any honest manner without concluding that in very large measure, it is the pioneering sales, advertising and promotion methods of American industry which have taught all of the American people to desire, to want, and to enjoy those services and products which, together, have brought about what we have come to accept and call this "American Standard of Living." And remember that when the temporary spur of rearmament is over, the only constructive solution to the basic problem of UNEMPLOYMENT will be to stimulate output and production by creating a new and higher "STANDARD OF LIVING" with its resultant increased demand for goods and *services*.

In closing, I want to urge the need for continuing and for coordinating your historic pioneering efforts to achieve new sales standards in 1941.

To do that, you will need to continue —in the face of a competition for public attention such as you have rarely faced— to tell people about the Basic Benefits of all of your various products and services. You will also need to know the fundamental Sales Appeals of those products and services; and you will furthermore need to know how to make your customers acquainted with those Sales Appeals in the most impressive fashion.

If you do that, you will automatically answer the question as to whether the *Use* of your "stove" will keep the little old lady warm. You will appeal to those underlying desires of your customers which cause them to *want* your services, at a fair and compensatory price, when they know and understand what comforts, what health, what pleasure, what profits, and what other basic benefits, they can achieve by using them liberally. And, finally, perhaps you will even succeed in making those customers appreciate, to a greater degree than past sales records might indicate to have been the fact heretofore, that the "bottles" of electric service which you are selling may really be filled with "champagne," and not merely with more or less kickless "beer" to be taken only because nothing more pleasing can be obtained.

Weather, Not Industrial Demand, Determines Date of December Power Peak

DEPENDING upon the weather, the peak load occurred on some electric power plant in December, 1940, on every day except four Sundays. The largest total, representing 15% of the sum of all the non-coincident peaks of the month, was reported for December 3, an extremely cold day with temperatures in the interior extending to 20° below zero. The next largest was on the evening of Monday, December 23, the heaviest shopping day of the year.

The following table shows the total for the month as reported by hours to the Edison Electric Institute:

SUM OF PEAK DEMANDS ON GENERATORS, IN THOUSANDS OF KW

As Reported Hourly by Electric Companies, in December, 1940

	Morning						Afternoon					Evening			
Day	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	Total Day
Mon 2	...	...	...	...	...	...	...	...	...	...	...	81	118	.....	199
Tue 3	1	...	...	...	...	...	...	...	...	...	...	3,746	37	.....	3,784
Wed 4	...	...	...	3	80	5	...	...	...	...	...	36	.....	.....	124
Thu 5	...	...	...	...	...	18	...	...	...	...	...	1,005	17	.....	1,040
Fri 6	...	...	...	...	...	...	...	...	...	...	...	129	.....	.....	129
Sat 7	...	...	...	...	...	...	...	...	...	...	...	.....	51	.....	51
Mon 9	...	...	...	...	...	...	...	...	...	...	...	333	121	.....	454
Tue 10	...	...	...	106	...	...	...	...	...	...	...	14	2	.....	122
Wed 11	...	...	...	12	33	...	...	...	...	1	...	1,320	118	.....	1,484
Thu 12	...	...	...	...	...	...	...	...	...	...	...	2,537	.....	.....	2,537
Fri 13	...	...	...	94	...	...	...	...	...	...	...	152	178	62	486
Sat 14	...	...	...	...	...	...	...	...	...	...	...	.....	15	103	118
Mon 16	...	...	...	...	...	...	...	...	...	...	467	1,001	.....	.....	1,468
Tue 17	...	...	...	50	...	...	...	...	...	...	132	1,262	1	.....	1,445
Wed 18	...	...	...	...	...	...	...	...	...	...	...	1,589	392	16	1,997
Thu 19	...	...	...	12	...	...	...	...	...	...	46	1,596	356	.....	2,010
Fri 20	...	...	...	76	...	...	...	...	...	...	...	984	49	.....	1,109
Sat 21	...	...	...	...	...	2	...	...	...	...	...	.....	9	25	36
Sun 22	...	...	...	...	...	...	...	...	...	...	...	6	.....	.....	6
Mon 23	...	10	...	...	6	2	...	...	...	...	...	619	2,584	74	3,295
Tue 24	...	...	...	...	...	...	...	...	...	...	...	2	18	.....	20
Wed 25	...	...	...	...	...	...	...	...	...	...	...	.....	55	.....	55
Thu 26	...	...	...	...	...	...	...	...	...	...	...	1,289	.....	31	1,320
Fri 27	...	...	...	1	38	...	...	...	...	...	...	2,186	36	.....	2,261
Sat 28	...	...	...	...	...	...	...	...	...	...	...	2	41	.....	43
Mon 30	...	...	12	...	...	...	...	...	...	...	7	622	79	.....	720
Tue 31	...	11	...	...	...	...	...	...	...	...	...	4	58	.....	73
Total	1	21	12	354	157	27	...	...	...	1	652	20,515	4,335	311	26,386

Suggested Approach to the Problem of Utilization Voltage Standards

By Howard P. Seelye
The Detroit Edison Company

Presented at the meeting of the Transmission and Distribution Committee, EEI, Detroit, Mich., Feb. 17, 1941.

FOR the past three years the Transmission and Distribution Committee and the Electrical Equipment Committee of the Edison Electric Institute have been actively studying the problem of utilization voltage standards. The need for such standards arises specifically from the multiplicity of service voltages which are in use throughout the industry. This leads to demands for considerable variety in ratings of utilization equipment and to the fear that the variety may tend to increase unless some steps are taken to limit the range by standardization. There also is considerable confusion among users in the nomenclature used, particularly that applied to nominal service voltage.

The results of a survey of the EEI members on this subject were presented to the Committees by Mr. J. H. Foote in February, 1940. This showed the range of voltages in use, their quantitative distribution, the voltage spreads, the maximum and minimum voltages causing complaints, etc. A further survey of 14 companies was made last year by the Subcommittee on Utilization Voltage. The question now before the Committees is what further step should be taken in analyzing these data and collecting additional data toward the establishment of some feasible standards. This paper suggests a method of approach to the problem, some definite values for voltage standards, and means for further study of the suitability of these values by analysis of individual systems.

Objective

The objective in this work is twofold—

1. To establish a definite range of utilization voltage for which the manufacturers must design their utilization equipment.
2. To indicate desirable values for service voltage and spread of service voltage, corresponding to the range established in (1), as a guide in the design of distribution systems.

As a corollary to (2), the study of service voltage should lead to a better recognition of the relationship between utilization voltage and service voltage and the necessary spread in the latter, and also of the division of that spread among the various components of the system.

Method of Approach

It is believed that it is impracticable to set up an ideal, narrowly restricted, standard of utilization voltage as a model and attempt to induce the whole industry to conform to it. There are too many well established variations of practice to expect to obtain anything like uniformity, at least for a long time to come. It would seem much better to approach the problem more realistically, by attempting to establish a practical range of voltage for utilization equipment which will meet the needs of a large part of the existing conditions and then later try to narrow that range as much as possible by introducing recommendations in regard to preferred voltages. In fact, present practice is meeting the situation, in that, although complete formal standards do not exist, equipment is being produced which operates reasonably satisfactorily under the existing variety of conditions. The object of standardization is to be helpful in defining limits to the variety. These limits will be a restriction on further increase in the range of voltages, will tend to narrow the range, by gradual reduction of the minority cases which fall in the upper and lower extreme voltages, and will tend to improve utilization equipment by establishing a recognized operating range conforming with the majority of better practice.

It is specifically proposed therefore that, for the purpose of discussion, a range of voltage for equipment be definitely selected, covering the voltages for which "satisfactory operation" is demanded. This may also be supplemented by a "preferred range" covering a narrower band of voltages for which best operating performance should be obtained. Further restrictions and preferred ranges for specific types of equipment will probably be necessary within the general range. In addition, a minimum operating voltage for motors should be stipulated.

Specific values are suggested as follows:

Satisfactory operating range	107 to 127 volts
Preferred operating range	110 to 125 volts
Minimum operating voltage (motors)	90 volts

These values were selected after a consideration of certain characteristics and requirements of system design which will be explained later. They are tentative only and subject to change, after discussion among users and with the manufacturers. It is recommended, however, that the general idea, which they illustrate, be accepted, with proper values to be assigned after such full consideration.

Service Voltage

In considering the service voltage to be supplied from any specific distribution system, there are three quantities which should be determined, either by choice or by survey of existing conditions. These are:

1. Average *lamp voltage to be supplied.
2. Voltage spread for *lamp voltage.
3. Relation between voltage spread and average voltage.

These quantities will each be discussed briefly.

1. *Average Lamp Voltage*—The average voltage which it is desired to furnish at the customer's utilization outlet depends upon several factors. The first is, of course, the rating of the lamps to be used. Two different ratings now cover the greater part of the field, namely 115 volts and 120 volts, and it would seem that for the present purpose only these two need be considered. The 120 volt lamps are in the majority but the 115 volt lamp has enough adherents to make it necessary to include it.

Once the lamp rating to be used is

* The term "lamp voltage" is used here to indicate voltage at the utilization outlet.

chosen, it does not follow, of course, that the average voltage should be the same as this rating. The voltage spread necessary, together with the maximum voltage which is thought desirable for lamps and other equipment, may point to an average somewhat lower than the lamp rating. Also, in some cases it may be preferred to use a somewhat lower voltage than rating. It may be thought better by some companies to have the majority of customers use a voltage not higher than lamp rating rather than to have half of them with voltages above rating and half below. When all such factors have been taken into account, the average utilization voltage can be chosen, either at rated voltage, such as at 120 volts, or below it, such as at 118 volts, or possibly even above it, such as at 121 volts. Particularly with 115 volt lamps there might be a tendency to use an average voltage above the rating, i.e., perhaps at 116 or 117 volts.

2. *Voltage Spread*—It is recognized, of course, that there must be a voltage spread in actual service voltages, that is, the voltage at some customers must be higher than that at others to allow for the necessary, uncompensated, voltage drop in lines and transformers. The amount of this spread depends on the type of system, the character of the load, and the care with which voltage regulation is controlled. It naturally must be more for rural lines than is necessary for urban distribution. Some values, which seem reasonably high enough for most cases, are suggested as follows. They apply to the voltage spread at the outlet rather than at the service, and are intended to include all outlets in a specific territory, except a very small percentage which might, of necessity, lie beyond the extremes of high or low limits of the spread. They should include at least 98 per cent of the lamps.

Urban networks	6 volts
Urban general	8 volts
Suburban and heavy rural	10 volts
Rural—light	12 volts

Naturally there will be some companies which will wish to keep their voltage spread within narrower limits than these, particularly in certain parts of their territory, and some may prefer even larger spreads, but these are suggested as typical of reasonable values.

3. *Relation between Voltage Spread and Average Voltage*—If all the customers served were uniformly distributed along the lines between points of maximum voltage and points of minimum voltage, the voltage distribution would follow a parabolic curve. The average voltage would be equal to the sum of the minimum voltage and 1/3 of the spread between minimum and maximum. For example, for a 10-volt spread, 115 to 125 volts, the average would be $115 + \frac{10}{3} =$ 118 1/3 volts.

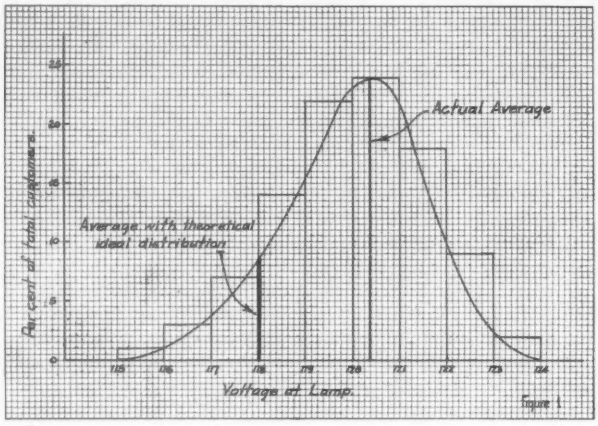


Figure 1

This theoretical distribution is modified by actual conditions on the system. Both primaries and secondaries frequently are branched, the effect being to have more customers on the branches, and hence at the lower voltages, than on the main trunks at the higher voltages. This tends to put the average voltage nearer to the minimum limit of the voltage spread. On the other hand, if the voltage spread used for design is considered to be a maximum, it is only reached at certain points on the system where lines and transformers are fully loaded. For example, only part of the transformers will be loaded to the maximum allowable limit, the others being in all stages, from light loading for new installations or replacements, up to the maximum of heaviest allowable loading. The average loading will probably be somewhere between 50 and 75 per cent of the maximum load, and hence the voltage drop will average only ¼ to ½ that assigned to transformers in obtaining the maximum spread. Similar conditions will be found on primary and secondary lines. This tends to make the average service voltage higher than the theoretical average.

The actual relationship between voltage spread and average voltage from any specific case can be determined only by a comprehensive voltage survey. It is suggested that individual companies make such surveys as a means of studying their own conditions and also to obtain data which will be of help in establishing the general standards. Such a survey would result in a distribution curve something like Figure 1. This curve would be helpful, not only in locating the position of the average in the spread but also in deciding on the proper average lamp voltage from consideration of the distribution of customers above and below the average, as mentioned under "Average Lamp Voltage."

It is believed that in the majority of cases the average voltage will be nearer to the mid-point of the spread, i.e., 120 for a spread of 115 to 125, than at the theoretical 1/3 point.

Determination of Voltage Range

The justification of the voltage range which was previously suggested can now be shown by assuming, for two extreme cases, values for the quantities pertaining to service voltage which have just been discussed. The extreme cases considered will be

Case I—Urban distribution, general, with 120 volt lamps, an average voltage approximately at lamp rating, a voltage spread of 8 volts, and an average voltage corresponding to the theoretical ideal of uniform distribution of customers, i.e., the 1/3 point of the spread. (This would be the same as for a voltage spread of 10 volts with the average voltage at the midpoint).

Case II—Rural distribution, with 115 volt lamps, an average voltage approximately at lamp rating, a voltage spread of 12 volts, and an average voltage at the mid point of the voltage spread.

A few further assumptions will be made, namely:—

1. The voltage drop in house wiring from service to outlet will be assumed to vary from a minimum of 1 volt to a maximum of 3 volts, giving a 2-volt spread to be added to the spread in the distribution system up to the service. It is recognized that some lamps will be close to the service point and hence will

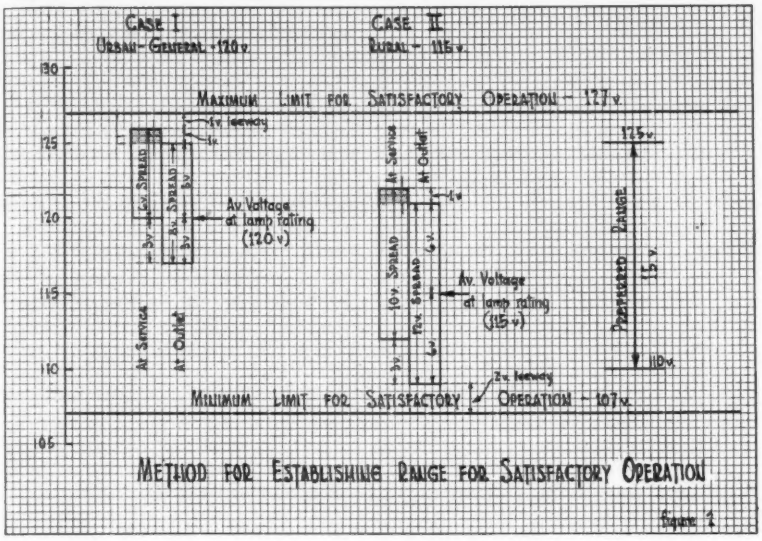


Figure 2

not be subject to the minimum 1-volt drop assumed, but the number of these lamps located at services having the maximum service voltage will be so few as to be insignificant. Also, in some buildings the drop to the farthest lamps will be more than 3 volts, but here again the percentage of the total located at services of minimum voltage is believed to be insignificant.

2. In establishing the maximum limit of the voltage range for satisfactory operation of equipment, a leeway of 1 volt above the maximum service voltage will be considered necessary in order to provide for unusually high cases in which the service voltage runs higher than the design maximum, due to unforeseen or unpreventable conditions. It must be remembered in this connection that some of the lamps at such services, even if only a few, will have full service voltage—so this leeway is 1 volt and not 2 volts over maximum lamp voltage.

3. In establishing the minimum limit of this voltage range, a leeway of 2 volts will be included below the minimum service voltage, determined for the extreme Case II. This is to provide for unusual circumstances where the service voltage runs below the design minimum, and cases where the building wiring has an unusually large drop.

In Figure 2 the analysis of Case I and Case II to determine the voltage range for "satisfactory operation" of equipment is indicated. For Case I, the average lamp voltage which was assumed at lamp rating (120 v) is first marked by the arrow. The voltage spread of 8 volts (at the outlet) is next divided approximately into thirds and fitted to the average voltage, with 3 volts below and 5 volts above. The spread of service voltage is next derived by setting its lower limit 3 volts above the lowest outlet voltage and its upper limit 1 volt above the highest outlet voltage, according to assumption (2). The result is a voltage spread at the service of 120-126 volts. Adding 1 volt leeway to this, gives 127 volts as the upper limit for which satisfactory operation should be required.

Case II is analyzed similarly. The average voltage is marked at 115 volts, this being assumed at the lamp rating. A spread of 12 volts at the outlet is divided equally, 6 volts above and 6 volts below the average, i.e., 109 to 122 volts. The spread at the service is obtained as in Case I by adding 3 volts to the minimum and 1 volt to the maximum of the outlet spread, resulting in a 10-volt spread, 112 to 122. A 2-volt leeway below the minimum outlet voltage gives 107 volts as the lower limit for which satisfactory operation should be required.

The limits of the range for satisfactory operation of equipment thus established at 107 to 127 volts is further confirmed by the data gathered from the Committees by questionnaire and reported by Mr. J. H. Foote in 1940. This showed a maximum service voltage of 127 volts and a minimum of 110 volts. If 3 volts is subtracted from the latter for drop in building wiring, 107 volts for the minimum is reached.

Figure 2 also shows a narrower "preferred range" of 15 volts from 110 to 125 volts. This covers most of the outlet voltages for both Case I and Case II. A still narrower preferred range may be found necessary, particularly for certain specific types of equipment, but this is suggested as a desirable general range for present conditions. Future developments should lead to a narrowing of this eventually.

Check of Intermediate Cases

The application of the general methods described for Cases I and II to other system conditions, intermediate between these two extremes, is illustrated by Case III to Case VI. These need not be

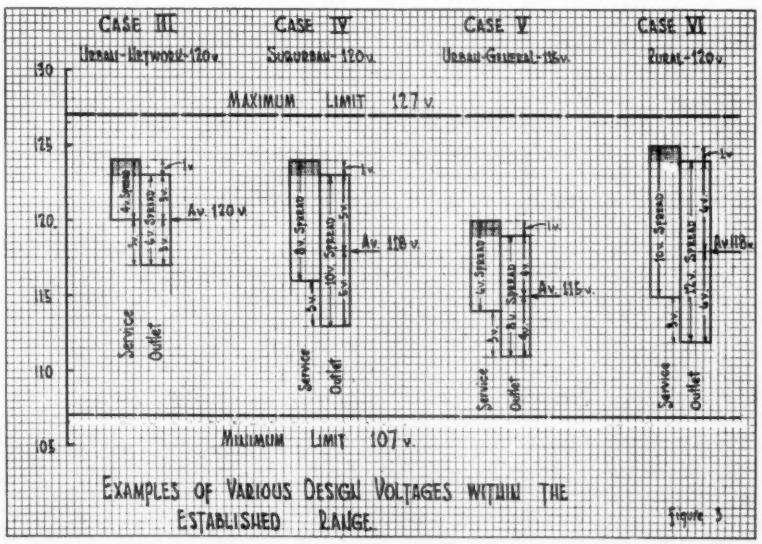


Figure 3

described in detail but the conditions assumed are listed in the following table:—

Case	Type of Distribution	Voltage Lamp Rating	Voltage Average Outlet	Voltage Spread Outlet	Position of Average
I	Urban—general	120	120	8	1/3 point
II	Rural	115	115	12	½ point
III	Urban—network	120	120	6	½ point
IV	Suburban	120	118	10	½ point
V	Urban—general	115	115	8	½ point
VI	Rural	120	118	12	½ point

There are, of course, a great many other possible cases with conditions peculiar to the specific needs or ideas of various individual systems. The above Cases are illustrative, however, and indicate how such conditions can be studied and how the results fall within the voltage range for equipment which was determined by Cases I and II. It is suggested that individual companies make such analyses of their own cases.

220 Volt Equipment

The requirements for 220 volt equipment have not been mentioned heretofore, but must, of course, be considered. Case I points to the maximum limit for satisfactory operation. If feasible, this limit could correspond to the 127 volts chosen for the lower voltage equipment, that is 254 volts. If, however, this is higher than can be accepted, in view of possible minimum requirements, it would seem reasonable to assume that the 1-volt minimum drop in the building wiring would always be present and that the 1-volt leeway need not be provided. This would bring the upper limit of the range down to 125 x 2 or 250 volts.

The lower limit would be determined by the voltage on 4-wire network distribution where the 3-phase voltage is 1.73 times the single phase voltage. Under the assumed conditions of Case III, the minimum outlet voltage would be 202.4 volts. A liberal leeway to provide for systems operating at lower voltages and for additional drop in building wiring would seem necessary. 7.4 volts is suggested, making the lower limit of the "satisfactory range" 195, the total range being 195 to 250 volts.

A narrower "preferred range" will also be necessary for this equipment. Limits of 200 to 245 are suggested for purpose of discussion.

Questions to Be Settled

As has been indicated a number of times throughout this discussion, the voltage values which are suggested are tentative. Final values can only be determined after a considerable amount of further study of various system characteristics to be met and of the possibilities in equipment design. If this general approach is used, the following specific questions must be answered—

1. Is the voltage range for "satisfactory operation" of equipment feasible and satisfactory? If not, is it too small? Is it too large? What modifications, if any, must be made for specific types of equipment?
2. Are the upper and lower limits of this voltage range satisfactory as suggested (107 to 127 volts)? If not, what should they be?
3. Are the maximum and minimum voltage drops, of 3 volts and 1 volt, assigned to building wires in determining total spread, reasonable and in accord with facts? If not, what values should be used?
4. Is the leeway of 1 volt at the maximum limit and 2 volts at the minimum limit, to allow for unusual cases, reasonable and satisfactory? If not, what values should be used?
5. Is the "preferred range" of 15 volts satisfactory? If not, what should it be?
6. Is the upper limit of the "preferred range," 125 volts, satisfactory? If not, what should it be?
7. Are the "satisfactory operating range" and the "preferred range" for 220 volt equipment satisfactory? If not, what should these be?

In order to crystallize this problem it is recommended that the plan of attack which has been suggested and the tentative values given be adopted as a basis for discussion. It is further suggested that the members of the T.&D. Committee be requested by questionnaire to prepare charts similar to Figure 3 showing their own individual variety of conditions. On the basis of these, they should be asked to answer the questions proposed above, both in regard to their present standards and also in regard to what they would be willing to accept in order to enable standard ranges to be established.

It is believed that this approach will be most likely to produce some definite results toward the attainment of the two major objectives in this problem of Utilization Voltage Standards.

Iowa Sales and Distribution Conference

MORE than 325 engineering and sales executives of Iowa utility companies attended the annual sales and distribution conference of the Iowa Utilities Association, held in Des Moines in the last week of January.

Subjects discussed by the distribution engineers included the speeding of trouble location on rural lines, methods of increasing distribution capacity, proposed changes in the national electrical safety code, processing and characteristics of pine poles, and telephone interference.

The symposium on rural trouble location was led by Mark Harpster, Peoples Gas and Electric Company. A wide range of practices was disclosed, including a plan for using civil township and section identifications in locating customers reporting trouble.

Iowa Public Service Company increases capacity by spreading transformer capacity, keeping down the size of secondary copper, M. W. Parr reported. From 75 to 80 per cent of the secondary copper is No. 4, the maximum size used being No. 2. A report on shunt capacitor use in Des Moines revealed that the 7080 kva in operation, costing $10 per kva, has increased power factor from 77 to 90 per cent.

Pending changes in the new National Electrical Safety Code were explained by George Charlesworth, Iowa Commerce Commission engineer, who also traced the history of a current legal discussion between Iowa State Regulatory Codes pertaining to authority in granting tree-trimming permits to utilities. Data on the characteristics of creosoted pine poles were presented by P. B. Mayfield, International Creosoting and Construction Company. The average life of well-treated pine poles is 30 to 45 years, Mr. Mayfield said. For general service, he recommended the 8-lb empty cell treatment, with 2 to 4 lb extra treatment for extra heavy duty.

Aileen Page, General Electric Company, reported statistics indicating the load and merchandising potentialities of complete home lighting. An investment of about $65 can secure complete light conditioning for the average home, she stated, bringing a load increase of 2 kw and an increase in energy use of 600 kwhr a year.

B. J. Price, Fort Dodge Gas and Electric Company, addressed the joint session of the sales and distribution groups. He urged members of the utility industry to take a fuller pride in the destiny of the industry and assume leadership in national defense activities.

13 Edison Medals Awarded Utility Employees

By Mae B. Woods

Secretary, Committee of Judges, Edison Electric Institute Medal

THIRTEEN CASES in which lives that might have been lost due to electric shock were saved by the prompt action of utility employees trained in resuscitation technique, were recorded in awards of the Edison Medal during 1940. The number of officially certified resuscitations in the electric light and power industry thus reached a total of 517. One hundred and three of these have been commemorated by Edison Medals; in 414 previous cases the employees who effected resuscitation received the Insull Medal of the National Electric Light Association.

In six of the certified cases recorded in this article all or part of the resuscitation was accomplished by the Pole Top method, in which the victim of a shock received while working on a pole is treated before being lowered to the ground. This method, a variation of the established Schafer Prone Pressure method, is a comparatively recent development in resuscitation technique, with the advantage claimed that it allows resuscitation to be started immediately, usually within a few seconds after the shock has been received. Prompt restoration of normal breathing is of vital importance in all cases of electric shock. In addition to eliminating the delay necessary to lower a shock victim, Pole Top resuscitation has been shown by tests to require slightly less time to move a given volume of air than the Prone Pressure method. Both are efficient in restoring breathing.

In two of the cases certified last year Pole Top treatment alone was sufficient to effect resuscitation; in four it was followed by Prone Pressure treatment. In seven cases Prone Pressure was used exclusively.

Employees of all electric light and power companies are eligible for the Edison Medal. A certificate describing the act of resuscitation, signed by the president of the Institute, is presented with each medal and a Certificate of Assistance is awarded those who have rendered valuable aid in resuscitation. Miniature medals and certificates are also given to members of line crews who have participated in cases of successful resuscitation. The medals have historical value since they contain copper from the original mains laid down in New York City by the late Thomas A. Edison as part of the world's first underground system for the distribution of current for electric light and power.

Circumstances attending the medal awards follow:

ARNOLD F. RUSS
Wisconsin

While changing wire from a broken pole to a new pole on July 27, 1939, Edward Olsen's spur cut out, allowing him to slip about two feet down the pole. His knee touched a grounded secondary at the same time that his hand and arm touched the hot primary. Arnold F. Russ, a fellow lineman of the Superior Water, Light & Power Company, Superior, Wis., who was working on the pole with Olsen, jerked Olsen free from the circuit and immediately started the pole top method of resuscitation. After four minutes Olsen recovered sufficiently to climb down the pole himself. He was then taken to a hospital. Severe electric burns to the right index finger, right middle finger, anterior, right palm, right forearm, right knee and inside of left palm were suffered by Olsen.

The Edison Electric Institute Medal and Certificate were presented to Mr. Russ on March 18, 1940, by Mr. Hugh A. Klemm, Director of Safety Education of the Industrial Commission of Wisconsin. One hundred and twenty-five persons attended the presentation at this safety meeting including officers and employees of the company, as well as city and county officials. Local papers carried accounts of the presentation.

ROY J. McQUAID
Wisconsin

On September 1, 1938, Alfred Rosenberg, an employee of the Superior Water, Light and Power Company, Superior, Wis., while inspecting line fuse disconnects on a pole received an electric shock which threw him to the ground. Roy J. McQuaid, a fellow employee immediately applied the prone pressure method of resuscitation and after about ten minutes the patient was breathing without assistance. He was then removed to a hospital. Mr. Rosenberg suffered burns on the left temple and on the bottom of his feet.

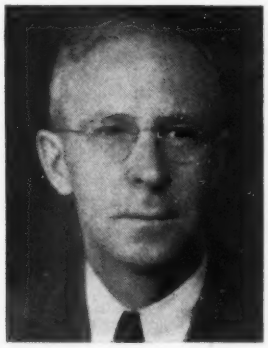
Mr. McQuaid was presented with the Edison Medal and Certificate on March 18, 1940, by Mr. Hugh A. Klemm, Director of Safety Education of the Industrial Commission of Wisconsin. More than one hundred persons witnessed the presentation ceremonies, including officers and employees of the company and city and county officials.

AXEL E. MELANDER
Washington

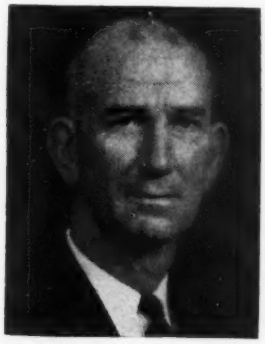
While removing an overhead 3-wire house service from the lower arm of a transformer pole on October 12, 1939, Dennis Robertson's head came into contact with a 6900-volt lead. Robertson fell clear of the circuit and slipped down the pole supported by his safety belt. Axel E. Melander of The Washington Water Power Company, Spokane, Wash., a fellow employee, immediately unfastened Robertson's belt and began to apply the prone pressure method of resuscitation. About four or five minutes elapsed before the patient was breathing without assistance. He was then removed to a hospital. Mr. Robertson suffered third degree electric burns, ¾ in. in diameter, top of his head, right side, and third degree electric burn, third finger, left hand, ½ in. in diameter.

Featured by the "Parade of Safety," a radio dramatization of the story of lives saved by employees of The Washington Water Power Company by the application of artificial respiration, an inspiring program sponsored by the Chamber of Commerce on April 16, 1940, accompanied the presentation of the Edison Medal and Certificate to Mr.

ARNOLD F. RUSS
Superior Water, Light & Power Co.



ROY J. McQUAID
Superior Water, Light & Power Co.



AXEL E. MELANDER
The Washington Water Power Co.

MALCOLM R. ROACHE
Pennsylvania Power and Light Company

Claude E. Bell, Appalachian Electric Power Co., receives Edison Medal from J. S. Smith

Charleston Line Crew, Appalachian Electric Power Co., Left to right: J. S. Herndon, R. T. Donegan and A. M. Reveal

Melander by Mr. J. D. Lewis, Division Manager of the company, at Pullman, Wash.

MALCOLM R. ROACHE

Pennsylvania

On October 5, 1939, Daniel Tauber, an employee of the Pennsylvania Power and Light Company, Allentown, Pa., grasped a wire attached to a crossarm which he forgot had been energized the day before. A fellow employee hurriedly mounted the pole and cut the wire. This released Tauber and he slumped down on the crossarm, unconscious. Malcolm R. Roache had in the meantime climbed the pole and administered pole top resuscitation. Tauber showed signs of consciousness in about two minutes, and was lowered to the ground, where prone pressure method of resuscitation was applied for about six minutes before Tauber was able to breathe without assistance. The patient was then removed to a hospital. There were third degree burns in palm of left hand at base of thumb, end of middle finger left and bottom of right foot at big toe, second degree burns inside right leg between knee and the ankle, and a cut on the top of his head.

Mr. N. G. Reinicker, Vice-President and General Manager of the Pennsylvania Power and Light Company, presented the Medal and Certificate to Mr. Roache on April 10, 1940, at a dinner meeting at which some three hundred employees were present. Wide publicity was given by the newspapers to this presentation.

CLAUDE E. BELL

West Virginia

Dennis R. Boone, an employee of the Appalachian Electric Power Company, Welch, W. Va., on November 5, 1939, was sitting on a concrete duct enclosure completing a painting job in the Switch Room. As he attempted to rise and step back over the duct enclosure, he slipped and fell against an energized blade of a disconnecting switch and then to the concrete floor. Claude E. Bell, an electrician's helper, saw Boone fall and immediately went to his assistance, extinguishing his clothes which were on fire, and then applying the prone pressure method of resuscitation. After about three minutes Boone showed signs of life. Beginning to struggle, he was then dragged to a safer location by the foreman, who applied artificial respiration for about 30 seconds more, when Boone became able to breathe without assistance. Boone was then removed to a hospital in an ambulance, where he remained for about one week. There were third degree burns on left shoulder and left foot, and a few spots of second degree burns on top of left foot, as well as a small cut on the side of his head.

Presentation of the Edison Medal and Certificate to Mr. Bell was made at the Employees' Quarterly Dinner meeting on July 1, 1940 by Mr. J. S. Smith of the Charleston, W. Va., Division of the company, in the presence of about 125 fellow workers.

LINE CREW, CHARLESTON DIVISION

West Virginia

On March 12, 1940, in attempting to remove a guy bolt from a transformer pole, C. B. Combs, an employee of the Appalachian Electric Power Company, Charleston, W. Va., accidentally came in contact with cutout on a 6900-volt line and was shocked and fell clear of the wire in an unconscious condition. R. T. Donegan, acting foreman of the Distribution Line Crew, who was on the ground near the pole noticed the accident and immediately climbed the pole and carried Combs' limp form to the ground where A. M. Reveal, a groundman, immediately applied the prone pressure method of resuscitation. He was relieved shortly by R. T. Donegan because of his more complete training in this work. In the meantime, J. S. Herndon, another member of the crew, got a doctor and assisted in treating the patient for shock. After about six minutes of resuscitation the patient showed signs of life, but not until artificial respiration had been applied for 11 minutes did the patient breathe without assistance. Upon arrival of the doctor, Combs was treated for burns and then removed to the doctor's office. Combs suffered burns on the right side of his head and burns on first two fingers.

The Edison Electric Institute Resuscitation Medal was presented to the Line Crew, Charleston Division of the Appalachian

Maynard Walker, Consumers Power Company, holds Medal while Julius Sherman, whose life he saved, looks on with, shall we say, deep approval.

H. B. Bryans, vice president, Philadelphia Electric Co., center, with members of the Ralph Sooy Line Crew, who hold Edison Electric Medal Certificates. Left to right: Paul A. Thomas, Ralph Klink, Mr. Sooy, Mr. Bryans, Paul D. Pearsall, John Gilbert and Harry H. Wolf.

Power Company, and miniature Medals to Messrs. R. T. Donegan, A. M. Reveal and J. S. Herndon on November 7, 1940, by Mr. D. C. Duncan, Assistant Safety Director of the company.

MAYNARD WALKER
Michigan

While attempting to open an oil switch on the premises of Crowley Boiler Works, Jackson, Mich., on March 19, 1940, Julius Sherman reached around an iron fence to take hold of switch handle and was rendered unconscious from electric shock. Sherman was pulled clear of the circuit by John Crowley, Manager of the Crowley Boiler Works. Maynard Walker, an automobile mechanic employed by the Consumers Power Company, who happened to be in the vicinity at the time, immediately began applying the Schafer Prone Pressure Method of Resuscitation. Walker continued his resuscitation for six minutes when he was rewarded by the first sign of life shown by Sherman. He continued his efforts and about two minutes later Sherman was breathing without assistance. In the meantime a doctor and the Fire Department arrived. Carbon dioxide was administered and the patient treated for burns. Not until the rate and rhythm had markedly improved would the doctor permit Sherman to be removed to a hospital. There were third degree burns on fingers.

The Medal and Certificate were presented to Mr. Walker on October 24, 1940, at the Otsego Hotel, Jackson, Mich., by Mr. F. D. Avis; the occasion being a Safety Dinner for the employees of the Consumers Power Company's Gas Distribution Department in celebration of their eighth consecutive year without a lost-time accident. There were approximately 100 present for the occasion. Newspaper accounts of the presentation of this Medal carried pictures of both Mr. Walker and Mr. Sherman.

RALPH SOOY LINE CREW
Pennsylvania

While at work stripping a pole of old crossarms and lines, William H. Solomon, an employee of the Philadelphia Electric Company, Philadelphia, Pa., removed the rubber protection from the wires and then started to change his position by climbing through the bare wires. In some manner he made contact with a primary phase wire as he was standing on the secondary rack. Paul D. Pearsall, an apprentice lineman, who was at work nearby, heard the roar of an arc and at the same time another member of the crew yelled, "Solomon is caught on the pole!" Pearsall grabbed his tools, put on his spurs and belt, and started to climb the pole when the roar stopped and Solomon fell clear of the circuit, feet up and head down.

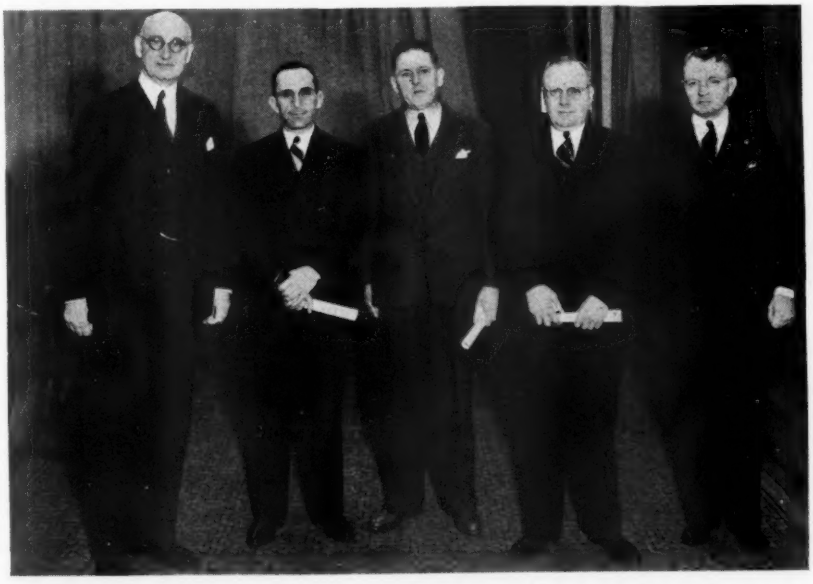
Reaching Solomon, Pearsall placed him in position and applied pole top resuscitation. He continued this for five or six minutes before Solomon showed signs of life. In the meantime Paul Thomas, a member of the crew, ascended the pole and secured a line around Solomon. Solomon's safety belt was then cut and he was lowered to the ground where prone pressure method of resuscitation was applied in turn by Harry Wolf, Ralph Klink and Paul Thomas, members of the crew. After about 25 minutes of resuscitation, Solomon breathed without assistance. Ralph Sooy, the foreman, was in charge of the rescue work and further assistance was given by John Gilbert, a ground hand. Solomon was removed in an ambulance to the hospital. There were burns of left side of neck, right foot and leg, and it was necessary to amputate his left leg above the knee.

The presentation of the Medal to the Ralph Sooy Line Crew, and miniature Medals to Messrs. Ralph Sooy, Paul D. Pearsall, Harry H. Wolf, Ralph W. Klink, Paul A. Thomas and John Gilbert was made by Mr. H. B. Bryans, Vice-President of the Philadelphia Electric Company, on January 19, 1941, before a group of company officials and employees. Publicity was given to this presentation by the local and adjoining city papers.

JULIAN WALTZ
New Jersey

Robert Hansen, a lineman employed by the Public Service Electric and Gas Company, Newark, N. J., was engaged on July 28, 1940, in determining phases and rearranging pothead taps on a 26 kv lateral pole. After having completed one operation, Hansen started to cross from one side of the rack to the other; in so doing, he came in contact with an open wire conductor which was energized and sustained shock which rendered him unconscious. Julian Waltz, also a lineman, who was at the pole end of the pothead rack saw what had happened and immediately kicked Hansen's foot clear of the conductor. Losing no time, Waltz placed himself in proper position on the rack and began to apply pole top artificial respiration on Hansen. After three minutes of resuscitation, Hansen showed signs of life. Waltz continued his efforts for two minutes more before Hansen breathed without assistance. Waltz then treated Hansen for burns and a short time later Hansen was able to descend from the pole without assistance. There were slight burns on both legs above the knees, a burn or scrape on the left arm and a sprained back.

The presentation of the Edison Medal and



Left to right: P. S. Young, Chairman of the Executive Committee, Public Service Corporation of New Jersey; Julian Waltz, lineman; William Howe, substation operator and Joseph Bell, mechanic, recipients of the McCarter Medal and W. R. Smith, Safety Engineer of the Company.

Certificate to Mr. Waltz was made by Mr. P. S. Young, Chairman of ... Executive Committee of the Public Service Corporation of New Jersey, on December 9, 1940, at a meeting of the Public Service Electric Association at Newark, N. J. At the same meeting, Messrs. William Howe and Joseph Bell were presented with the McCarter Medal for successful resuscitation of persons overcome by gas.

C. F. FROHNE

Kansas

On April 16, 1940, W. H. Dunham, employed by the Kansas Gas & Electric Company, Wichita, Kan., was engaged in cleaning the high voltage side of the tank of a transformer when, in moving forward, a button on the top of his cap made contact with a conductor. Dunham straightened up and fell in the clear in an unconscious condition. C. F. Frohne, another member of this maintenance crew, was just outside of the fence around this transformer. When he heard the noise of an arc, he looked toward Dunham in time to see him straighten up and fall toward the fence. Frohne rushed to where Dunham was lying and finding him unconscious started applying the prone pressure method of resuscitation. Working alone, Frohne continue his efforts for 15 minutes before he was rewarded with signs of life from Dunham. In the meantime he was able to attract the attention of another workman and ask him to call for a doctor and an ambulance. After five more minutes of resuscitation, Dunham breathed without assistance and was later removed to a hospital. He suffered burns on scalp, and the sole and heel of right foot were burned deeply.

The Medal and Certificate were presented to Mr. Frohne on January 3, 1941, before an all-employee meeting held in the auditorium of the company's service building in Wichita. The presentation was made at the opening of the meeting by Mr. Murray F. Gill, President of the company, who stressed the great significance of the award in his opening remarks: "This Medal is never given except after a complete investigation in which it is clearly established that the life of the fellow workman could not have been saved had it not been for the training and quick thinking of the individual earning the award."

Murray F. Gill, President and General Manager, Kansas Gas and Electric Company and Charles F. Frohne, lineman.

AMITE CREW

Louisiana

On July 11, 1940, Anderson Tate was walking along a path underneath a 22,000-volt feeder and came in contact with a down-guy which had become energized after a 22 kv insulator had been broken by lightning. Tate was rendered unconscious and fell clear of the circuit. R. S. Ellis, for whom Tate worked, came across Tate shortly after. Ellis summoned the Amite Crew of the Louisiana Power and Light Company, New Orleans, La., who were in calling distance, trying to locate the damage on line. J. W. Gaines, district manager, immediately started applying the prone pressure method of resuscitation. He was relieved by Ted Varnado and Philip Lee, members of the Amite Crew, and after 20 minutes of resuscitation effort, Tate showed first signs of life. Resuscitation continued for about 10 minutes more before Tate was breathing without assistance. He was then removed to a hospital, where it was found that he had suffered electrical shock, third degree burns of back of head and heel of right foot.

A drama-packed story of quick thinking, quick action and preparedness to meet emergencies was unfolded on February 5, 1941, at Chemekete Lodge, near Hammond, La., when Messrs. Gaines, Lee and Varnado received from Mr. W. O. Turner, President of the company, the Edison Electric Institute Medal for saving human life. The presentation was made in the presence of a group of 61 South Louisiana newspaper editors, mayors, civic leaders and members of the company.

W. O. Turner, President, Louisiana Power and Light Company and three members of the Amite Crew. Left to right: Mr. Turner, Jack Gaines, Jr., Philip R. Lee and Ted E. Varnado.

VERNON PATTON

New Jersey

Michael Connelly, first-class lineman of the Jersey Central Power & Light Company, Asbury Park, N. J., on August 9, 1940, was engaged in changing over dead-end primary wires and was preparing to service a connection when in some manner he made contact with the 4000-volt primary wire upon which he was working. T. Armstrong, who was acting as groundhand, heard the noise and looked up and saw Connelly on the secondary rack with the wire against his shoulder and shirt sleeve ablaze. Armstrong yelled for help and as he watched he saw

Connelly fall back clearing the circuit. Vernon Patton, who was working on a pole three sections away, heard Armstrong's call and was first to reach Connelly. He placed him almost upright on one side of his safety belt and proceeded to apply pole top artificial respiration. He worked for five minutes before Connelly showed any signs of life. He continued his efforts and after five minutes more, Connelly began to breathe without assistance. Without the assistance of others, Connelly was lowered to the ground, wrapped in blankets and the resuscitation continued using the prone pressure method. Shortly after he was treated by a doctor, placed in an ambulance and removed to a hospital. During this it was found necessary to continue artificial respiration for 35 minutes more. Connelly suffered third degree burns right arm between shoulder and elbow, soles of both feet, first degree burns both breasts from heat pads, resulting in the loss of two toes and the necessity of skin grafting on both feet and right shoulder.

On December 15, 1941, at a banquet for employees of the Northern Division of the company, Mr. Patton was awarded the Edison Medal and Certificate by Mr. J. T. O'Brien, Safety Director of the company. There were over 100 employees at the affair which was held in Troy Hills, N. J.

Left to right: F. C. Weiss, Manager of the Engineering and Construction Department, Alabama Power Company; W. T. Pepper; C. T. Harris, line foreman; F. T. Summerlin, R. E. McLane, A. C. Fincher and T. C. Acton, the resuscitated lineman who held the medal and a certificate while this picture was made.

LINE CONSTRUCTION CREW
Alabama

On August 5, 1940, T. C. Acton, a lineman of the Alabama Power Company, Birmingham, Ala., had just completed removing a hot line clamp with a switch stick from a pole transformer when, in some manner, his left forearm made contact with a 6900-volt wire grounding through his right thigh which was contacting a guy wire. C. T. Harris, the crew foreman, who was approaching the pole on which Acton was working, looked up and saw that Acton was in trouble. Shouting to Fincher and Summerlin, members of the crew, he told them to come quickly. Fincher climbed the pole with Summerlin right after him with a switch stick. Summerlin succeeded in knocking the hot wire clamp out of Acton's hand and held it clear as Fincher started pole top artificial respiration on Acton who was lifeless and not breathing. After about two minutes of resuscitation Acton started struggling and had convulsions. Pepper and Whitley, also members of the crew, ascended the pole and helped control Acton's struggling. Fincher continued his resuscitation as Acton was lowered to the ground, where the prone pressure method was applied by Harris, Pepper, Pearce, McLane and Fincher again. After about 10 minutes Acton showed signs of breathing without assistance. He was treated by a doctor and taken to a hospital in an ambulance. Acton suffered third degree burns on left wrist, forearm, and right groin and a small burn on left thumb and left index finger.

At a Safety Meeting on February 4, 1941, of the Alabama Power Company, which was attended by more than 75 employees, Mr. F. C. Weiss, Manager of the Engineering and Construction Company, presented the Edison Medal to the Line Construction Crew, with miniature Medals to Messrs. C. T. Harris, W. T. Pepper, R. E. McLane, A. C. Fincher and M. F. Pearce.

Edison Birthday Observed Throughout Country

MEETINGS and observances commemorating the ninety-fourth anniversary of the birth of Thomas Alva Edison were held on February 11 throughout the United States.

Thomas A. Edison Day was proclaimed by the Mayors of Detroit, Houston, Texas, and South Orange and Orange, N. J. Ceremonies also were announced in Washington, Philadelphia, Boston, Pittsburgh, Seattle, Buffalo, San Francisco, Dallas, Texas; Oklahoma City, Great Falls, Mont.; Allentown, Penna.; Oakland, Calif.; Lancaster, Pa.; Newark, Montclair, N. J.; and Fort Myers, Fla.

In New York the Edison Pioneers, men who worked with the inventor, joined with his widow and son, Governor Charles Edison of New Jersey, to pay tribute to Mr. Edison at a luncheon held at the Hotel Astor. Governor Edison, who spoke at the gathering, urged that the nation approach its problems in the spirit of enthusiasm and courage exemplified by his father.

Mrs. Mina Edison Hughes, widow of the inventor, spoke briefly, voicing her "tribute to all the loyal, fine souls who worked with him."

Harold P. Brown, who worked with the inventor in 1876, and J. Parker Hickman, who worked in the original lamp works with Edison as a boy of 16 in 1880, were the longest associated with the inventor among those at the luncheon.

Several of those who worked with the inventor spoke, among them Edwin W. Hammer, who was elected president of the organization at the luncheon. He told of the formation of the organization January 24, 1918, by twenty-eight of the "pioneers." Only five of those charter members are now alive.

Albert O. Tate, who succeeded Samuel Insull as Edison's private secretary in the Eighties, related the circumstances surrounding several of the chief inventions. Walter Kruesi, son of the man who made the original phonograph in three days from plans drawn by Edison, and Mrs. Naomi Mackenzie Chaffee, daughter of James U. Mackenzie, who taught Edison telegraphy, also spoke.

The group stood in silence for a moment after the names of fifteen members of the Pioneers who died in the last year were read.

Other officers elected were: Honorary president, W. S. Barstow; vice-presidents, Governor Edison, J. Parker Hickman, Walter Kruesi and Eugene C. Reed; secretary, Chester M. Withington; treasurer, Walter S. Mallory, and to the executive committee, Sidney Z. Mitchell, Albert O. Tate and Montgomery Waddell.

History of Light Told in Newspaper Feature Cartoons

THE story of light and seeing throughout the ages is told in an interesting way, complete with pictures, a touch of humor and with Better Light suggestions entertainingly presented, in a series of newspaper feature cartoons prepared by the National Better Light-Better Sight Bureau.

Entitled "Eyes Right" and drawn by Squier, the 12, two-column, 84-line panels illustrate the history of artificial light from the grease-soaked moss used by the caveman to the I.E.S. lamp, together with unusual facts on lighting customs in many periods. The panels consists of four or five pen drawings, with descriptive copy accompanying each picture.

Many famous figures appear in these panels: Paul Revere and his lantern, Florence Nightingale, "The Lady with the Lamp," Nero, and his avenue of human torches, Ahura Mazda, Persian sun god whose name appears on lamp bulbs in every American home today, and other historical characters who have affected the story of light.

The popular cartoon presentation used in "Eyes Right," with brief hand-lettered text and a humorous drawing to brighten each panel, assures high reader interest. The promotion of Better Light in today's homes and offices is presented so skillfully that it is entirely unobjectionable.

This effective lighting promotion will prove welcome material for most newspapers. Everyone enjoys odd bits of information and when these facts are shown in picture form, they get attention from all who see it.

Since the set of 12 mats is available at a price of only $2.40, "Eyes Right" is one of the least expensive forms of publicity that any utility could obtain. Most companies can profitably supply a set of mats to newspapers throughout their territory.

More than 4000 of these mats have been sold already, although they have been available only since the middle of January.

Mats of the "Eyes Right" series may be obtained from the National Better Light-Better Sight Bureau, 420 Lexington Avenue, New York City. They will be sent either to the purchaser, or direct to the newspapers designated by the local company.

Eyes Right! . . . by Squier
MAN'S FIRST LIGHT WAS, OF COURSE, HIS COOKING FIRE. THE IDEA OF A LAMP WAS PROBABLY BORN WHEN A BIT OF FLAMING MOSS OR STICK FELL INTO DRIPPINGS OF FAT. OBSERVING THAT THIS FLAME WAS BRIGHTER AND LONGER LASTING, MEN SOAKED MOSS IN GREASE FOR LIGHTING THEIR CAVES.
OVER-DRAWN AGAIN!
NIX!
TORCHES OF BRONZE DEVELOPED BY THE ATHENIANS WERE OF GREAT ARTISTIC BEAUTY BUT DUBIOUS ILLUMINATING VALUE. THEY WERE CONICAL IN SHAPE, THE HOLLOW CENTER BEING STUFFED WITH OILY RAGS.
IN 1789 THE ENGLISH DISTILLED GAS FROM COAL. INTRODUCED IN THE U.S. IN 1816, IT WAS LITTLE USED, DUE TO LACK OF FACILITIES. BY 1875, HOWEVER, IT WAS THE GENERALLY ACCEPTED METHOD OF LIGHTING.
"STICKING TOMMY" WAS THE NAME GIVEN TO THIS CANDLE HOLDER BY GLOUCESTER FISHERMEN
BUT I CAN'T PRONOUNCE IT!
DEVELOPMENTS RAPIDLY FOLLOWED EDISON'S LAMP OF 1879, THE "STOPPER" LAMP ABOVE LIT THE CHICAGO WORLD'S FAIR OF 1893. DESPITE GREAT IMPROVEMENTS IN LIGHTING, EYE DEFECTS INCREASED DUE TO GLARE, MISPLACED FIXTURES, OVERUSE OF EYES IN POOR LIGHT.
TODAY, HOME AND FACTORY LIGHT CAN BE SCIENTIFICALLY MEASURED TO INSURE PROPER INTENSITY. EYESIGHT SPECIALISTS AGREE THAT ADEQUATE AND PROPERLY DIFFUSED LIGHT CAN GREATLY DIMINISH THE DANGER OF EYE STRAIN, IMPROVE GENERAL HEALTH AND DISPOSITION.

Eyes Right! . . . by Squier
WHY, GOLLY THORPE! IT AIN'T FOR SOUP!
TO LIGHT HIM ON HIS WAY
PAUL REVERE
CARRIED A LANTERN OF THE TYPE WHICH NOW BEARS HIS NAME - ITS PUNCHED METAL SIDES EMITTED VERY LITTLE LIGHT, BUT DID SHIELD THE FLAME. SCRAPED BONE AND GLASS WERE SOMETIMES USED FOR WINDOWS IN LANTERNS OF THE PERIOD. REVERE'S OLD LANTERN, POOR AS IT WAS, LIGHTED A NATION TO LIBERTY.
REVERE'S LANTERN
SAUCER-LIKE LAMPS OF CLAY OR STONE ARE AMONG THE OLDEST ARTICLES DUG UP BY ARCHAEOLOGISTS. AT NIPPUR, IN BABYLONIA, DESTROYED OVER 8000 YEARS AGO, SUCH LAMPS WERE FOUND.
RENAISSANCE RESIDENCES WERE LIGHTED BY "IMPROVED" LAMPS HAVING SEVERAL WICKS AND A SINGLE RESERVOIR. ORNATE METAL BASKETS, HUNG BESIDE GATES AND OUTER DOORS TO BE FILLED WITH BLAZING LOGS WHEN VISITORS WERE EXPECTED
REVERE'S WARNING FINDS ITS ECHO TODAY IN THE WARNING SYMPTOMS OF EYE STRAIN - SQUINTING, HEADACHES, WATERY EYES, LACK OF INTEREST IN READING OR GAMES REQUIRING CONCENTRATED EYE EFFORT. MOST EYE-STRAIN AND HENCE MUCH DEFECTIVE VISION CAN BE PREVENTED BY CORRECT LIGHTING

Eyes Right! . . . by Squier
THE PREVALENCE OF BLINDNESS, PARTICULARLY AMONG SCHOLARS, DURING THE MIDDLE AGES WAS LARGELY DUE TO OVERWORKING THEIR EYES UNDER THE POOREST LIGHTING CONDITIONS.
SEVENTEENTH CENTURY GERMANS INGENIOUSLY COMBINED A LAMP AND A TIMEPIECE BY GRADUATING THE OIL RESERVOIR SO THAT AS IT CONSUMED FUEL, IT MEASURED THE HOURS
The World's Largest Light Bulb
TOPS A 131-FOOT TOWER AT EDISON'S MENLO PARK LABORATORY SITE. ITS 14 FEET HIGH, MADE OF 2-INCH GLASS... BUT IT'S A DUD! 12 ACTUAL BULBS, WIRED FROM 4 SEPARATE POWER LINES, PROVIDE THE "ETERNAL LIGHT" INSIDE.
THE WORLD'S SMALLEST LIGHT BULB IS THE BRAIN OF WHEAT LAMP USED ON THE END OF CATHETERS & OTHER SURGICAL APPLIANCES FOR INTERNAL EXAMINATION OF VARIOUS ORGANS OF THE BODY
50 YEARS AGO, MANY OF THE NATION'S SCHOOLS HAD NO ARTIFICIAL LIGHT OF ANY KIND!
TODAY, SCHOOLS ARE BECOMING MARVELS OF WELL PLANNED LIGHTING, GIVING EACH STUDENT HIS SHARE. AS A RESULT OF EASIER SEEING, COMFORT AND INTEREST ARE INCREASED, WITH A CORRESPONDING RISE IN STUDENT EFFICIENCY.

Home Lighting Equipment Committee Announces Contest

A TOTAL of $1,000 in cash prizes will be awarded utilities for outstanding achievements in promoting or selling home lighting equipment or both, during the first six months of 1941, by the Home Lighting Equipment Sales Committee, EEI. There will be a First Award of $500, Second Award of $200, Third Award of $100 and four awards of $50 each.

Activities may be conducted by the utility only, by utility and dealers, or for dealers only. Campaigns may cover the promotion and sale of IES lamps, Pin-to-Wall lamps, other portables, lighting fixtures, adapters, converters and modernizers, all equipped with proper size bulbs, either singly or in any combination of these types.

Judges will consider, among other phases of the activities, the ingenuity of sales promotion and advertising, completeness of sales training and programs, and scope of activities. The effectiveness of the plans, unit sales in relation to total domestic customers, and the load building value of equipment sold will also be included.

Activities entered in the contest must take place between Jan. 1 and June 30, 1941. A guide sheet with additional information will be sent upon request to utilities entering the contest. Address Home Lighting Equipment Sales Committee, Edison Electric Institute, 420 Lexington Ave., New York City.

Eighth Annual E. E. I. Sales Conference

Comprehensive Program Covers All Phases of Commercial Activities

THE Eighth Annual Sales Conference of Edison Electric Institute at Edgewater Beach Hotel, Chicago, on March 31 through April 3 will bring together several hundred of the commercial men of the electrical industry. Representatives of all branches of the industry interested with the utility in business development are welcome to attend.

An innovation this year will be Sectional Conferences to make it possible for wider discussion of important classifications of business. Problems of Rural Sales Development, Power Sales, Lighting Sales and Home Service will be highlighted in special sessions.

The Program of the Power Sales Section covers two full days—March 31 and April 1. This is a joint conference with the Great Lakes Power Club and is the only one that will be closed to other than utility representatives.

Running parallel with Power will be the Rural Sales Section Conference, all sessions of which will be open to members of the electrical industry.

On April 1 there will be a Lighting Sales Conference morning and afternoon, and in parallel with this the Home Service women of the industry will have a full-day meeting.

The General Sessions will be on Wednesday and Thursday, April 2 and 3, with prominent speakers from within and without the industry on important and timely subjects. All sessions are open. At the closing luncheon session the second day there will be a Symposium on National Defense.

Here are four days of information and education on the progress and future of business development among consumers of electricity that will justify the attendance of hundreds of persons concerned.

The subjects to be covered in the four-day Conference are as follows:

SUBJECT PROGRAMS

EIGHTH ANNUAL SALES CONFERENCE, EDISON ELECTRIC INSTITUTE

Edgewater Beach Hotel, March 31-April 3

GENERAL SESSIONS—April 2-3

R. E. FISHER, *Chairman*

Morning Session—April 2

- PREPAREDNESS FOR POST-WAR PERIOD
- HOLD THE SELLING TEMPO
- TELL THE WORLD ABOUT OUR SERVICE
- ECONOMIC ASPECTS OF RURAL ELECTRIFICATION

Afternoon Session—April 2

- KEEPING HOUSEHOLD APPLIANCES AT WORK
- BENEFITS TO CUSTOMER AND UTILITY IN ROOM COOLING
- DANGER—MEN AT WORK
- THE MARCH OF MODERN KITCHENS
- (To be followed with Preview of Film)

Morning Session—April 3

- HOME SERVICE—WHAT IS IT?
  (A dramatic interpretation)
- A DEALER'S VIEWPOINT ON UTILITY-DEALER SELLING
- RE-WIRING COMMERCIAL OCCUPANCIES
- FLUORESCENT LIGHTING NOW READY FOR INDUSTRY COORDINATION

Luncheon Session—1:15 p.m., April 3

Symposium on National Defense

- a. GENERAL DEFENSE PROBLEMS TO BE SOLVED
- b. THE UTILITIES ARE READY
- c. EXPECTATION FOR PRODUCTION AND DELIVERY OF ELECTRICAL EQUIPMENT

POWER SALES SECTION—March 31-April 1

(Joint Sponsorship with Great Lakes Power Club)

C. H. PURDY, *Chairman*

Morning Session—March 31

- THE PLACE OF POWER SALES IN THE UTILITY
- OUR OPPORTUNITY
- NEW WAYS TO PREPARE AND PRESENT YOUR STORY
- THE WAY ONE SALESMAN CLOSES BUSINESS

Afternoon Session—March 31

- OTHER SOURCES OF POWER—PAST, PRESENT AND FUTURE
- ELECTRIC UTILITY PROGRESS—PAST, PRESENT AND FUTURE
- DISCUSSION OF SALES TODAY
- OIL ENGINES
- STEAM EQUIPMENT
- DISCUSSION:

Morning Session—April 1

- ELECTRIC HEATING DEVELOPMENTS
- INFRA-RED UP TO DATE
- THE MOST EFFICIENT EQUIPMENT, PLANT MODERNIZATION, NEW USES
- INDUSTRIAL DEVELOPMENT — BUILDING YOUR CUSTOMER'S BUSINESS

Afternoon Session—April 1

- HOW TO KEEP UP TO DATE
- APPLICATION OF SALES TOOLS TO THE JOB—IMPROVED SALES RESULTS—POWER SALESMAN'S JOB IS TO SELL
- SALESMEN I HAVE MET
- SUMMARIZATION OF THEME OF CONFERENCE—"SELLING INDUSTRIAL POWER TODAY"

(Program continued on next page)

RURAL SALES SECTION—March 31-April 1

F. A. COFFIN, *Chairman*

Morning Session—March 31

RURAL ELECTRIFICATION FROM THE EXECUTIVE'S VIEWPOINT

PROMOTING RUNNING WATER IN RURAL AREAS

OPPORTUNITIES IN DAIRY ELECTRIFICATION

POULTRY EQUIPMENT SALES TO CROW ABOUT

Afternoon Session—March 31

ADEQUATE WIRING FOR THE FARM

FARM ELECTRIFICATION LEVELS LOAD CURVE

COORDINATING AGRICULTURAL COLLEGE RESEARCH AND EXTENSION WITH UTILITY EFFORT

DON'T FORGET THE FARMER'S WIFE

Morning Session—April 1

UTILITY COOPERATION WITH ELECTRIC MEMBERSHIP COOPERATIVES

SALES FOLLOW SURVEYS

FISHING FOR BUSINESS OR BUSINESS FOR FISHING

ELECTRICITY IS THE CHEAPEST EXPENSE ITEM IN PRODUCING FARM COMMODITIES

LIGHTING SECTION—April 1

Morning Session—April 1

FLUORESCENT LIGHTING PROGRESS—A SURVEY

INDUSTRIAL LIGHTING—THE NEED OF THE HOUR

SYMPOSIUM ON CREATIVE SELLING

(a) LIGHTING SALES TRAINING

(b) LIFE IN LIGHTING LAYOUTS

(c) KITS DO CONVINCE THEM

(d) COMMERCIAL LIGHTING TO THE FORE

SELL THE SMALL COMMERCIAL CUSTOMER—IT PAYS

Afternoon Session—April 1

A PASSPORT TO LIFE

YOUR BUSINESS AND HUMAN BENEFITS

DEVELOP THE HOME LIGHTING MARKET

EXPERIENCE LEADS THE WAY

HOME SERVICE SECTION—April 1

FERN SNIDER, *Chairman*

Morning Session—April 1

NEW APPROACHES IN GROUP DEMONSTRATION WORK

PROMOTING THE SALE AND USE OF HOUSEHOLD APPLIANCES

KITCHEN PLANNING AS A SALES TOOL

LIGHTING IN THE HOME SERVICE PICTURE

Afternoon Session—April 1

METHODS USED IN PROMOTING ADEQUATE WIRING

THE HOME ECONOMIST'S ROLE IN DEALER CO-OPERATION

KEEPING CUSTOMERS SOLD

COOPERATION WITH HOME ECONOMICS DEPARTMENTS OF SCHOOLS

EVALUATING HOME SERVICE WORK

Power Sales Section Plans Timely Program

"SELLING Industrial Power Today" has been selected as the central theme of the National Power Sales Section of the Eighth Annual Sales Conference of EEI, which will be held at the Edgewater Beach Hotel in Chicago, March 31 and April 1. The Great Lakes Power Club has joined with the Power and Heating Sales Committee in sponsoring the program of this Section Conference. The Power Sales sessions are expected to attract representatives of electric utility companies in all sections of the country.

With the American industrial machine already roaring toward accomplishment surpassing anything in history, the role of power looms larger and larger—power for the production of defense materials, for the continued smooth operation of vital services, for the maintenance and advance of the American standard of living. The unprecedented activity is creating new opportunities for utility power sales organizations, but it also confronts them with problems that demand up-to-the-minute selling technique. The program of this year's conference has been planned to provide an exchange of ideas and experience that will be of practical and immediate aid to every electric utility in its job of selling the industrial market of 1941 and 1942. The speakers are sales executives and others whose records of achievement are guarantees of worthwhile discussions on vital topics.

At the first session on Monday morning, March 31, five speakers will present a comprehensive view of the utility power sales job and concrete advice on how it can be done effectively. Following a brief opening address by Chairman C. H. Purdy and welcome by M. V. Woodard, president of the Great Lakes Power Club, Merrill Skinner, Buffalo, Niagara and Eastern Power Corporation, will discuss "The Place of Power Sales in the Picture," defining the present-day function of power sales in relation to the electrical industry as a whole. How the power man organizes and divides his activities to get the best results within his sphere of action is the assignment of the third speaker, F. McQuillin, of the West Penn Power Company.

The next step is right into the customer's office to make a sales presentation. Mr. L. J. Lamberger, Duquesne Light Company, will demonstrate the value of a complete analysis of any power sales problem. Then, as the logical conclusion, will come "How One Man Closes Business," by H. T. Dixon, Public Service Company of Northern Illinois, who believes in and practices the certain and profitable closing of the sale.

A symposium of sure-fire interest makes up the Program of the Monday afternoon session. Its subject is the utility's position in relation to other sources of power that are factors in the industrial market. J. S. McMillen, Northern States Power Company, will present

(*Continued on page* 80)

Fifth National Accounting Conference at Cincinnati, April 7-8

THE Fifth National Accounting Conference of the American Gas Association and the Edison Electric Institute will be held at the Netherland Plaza Hotel in Cincinnati, Ohio, on April 7 and 8, 1941. Cincinnati is advantageously located to encourage attendance from both large and small companies in the West as well as the East.

E. N. Keller, Philadelphia Electric Company, chairman of the AGA accounting section, and G. H. Bourne, The Commonwealth & Southern Corp., who heads the EEI accounting committees, will direct the conference proceedings as co-chairmen. Assisting them in preparations now under way is a Planning Committee made up of company and staff representatives under the co-chairmanship of H. A. Ehrmann, Consolidated Edison Co. of New York, Inc., AGA, and L. A. Mayo, The Connecticut Light and Power Co., EEI. Members are, for AGA, H. E. Cliff, Public Service Electric and Gas Company; O. H. Ritenour, Washington Gas Light Company; J. A. Williams, Niagara Hudson Power Corporation; S. J. Barrett, The Peoples Gas Light and Coke Company, and L. L. Dyer, Lone Star Gas Company; for EEI, H. B. Hardwick, The Commonwealth & Southern Corp.; H. H. Scaff, Ebasco Services, Inc.; A. S. Corson, The United Gas Improvement Company; A. G. Mitchell, Philadelphia Electric Company, and F. B. Flahive, Columbia Gas and Electric Corp. The Planning Committee will conclude the final details of this two-day conference program about the time this issue of the BULLETIN goes to press. A preliminary conference program will reach all companies about March 15, in which all scheduled conference activities will be outlined.

The program already developed promises plenty of material of current interest and importance to utility accountants. The high standard set at previous conferences will be maintained. Emphasis has again been placed on individual meetings of specialized groups which will be conducted along informal lines. This will insure a free exchange of ideas in accordance with the expressed preference of delegates at previous conferences.

A general session will be held Monday morning with Monday afternoon and all of Tuesday devoted to group meetings. Many papers will be presented at these group meetings to be followed by open discussion in which all those present will be urged to participate. Informal "round tables" have been planned for many of these meetings, the procedure being to present selected subject matter in a five or ten-minute planned discussion and then throw open the arena to all comers. There will be no dinner meeting.

Monday

The general session will open promptly at 9:30 a. m. on Monday, April 7, and close at 12 noon. Prominent speakers from the industry and from educational, professional and regulatory fields will be presented at this session when all the accountants will be together. Only lively and important topics of general interest will be included.

The specialized groups will go into action in earnest Monday afternoon. Individual meetings are planned for customer activities, including customer relations, customer accounting and credits and collections, depreciation, materials and supplies, plant records, insurance, taxation, regulatory problems, internal audits, budget control, manuals of procedure and other accounting activities. Most of the sessions will be open to all delegates.

Tuesday

On Tuesday morning the assembled delegates will divide into two or three groups. Industry problems involving all principal phases of utility accounting will be discussed at these large group meetings. The sessions will be open, but their proceedings probably will not be included in any published proceedings relating to the conference.

Most of the conference work Tuesday afternoon will be done at luncheon sessions. About ten of these will be held, each one concerned with an important division of utility accounting. Discussion leaders will be appointed and the programs have been planned to afford accountants an opportunity to discuss frankly with their fellows the real problems of the industry.

Although all meetings will end Tuesday, the Planning Committee is now making arrangements so that delegates who wish may use Wednesday to visit the accounting plant of the Cincinnati Gas and Electric Company.

Missouri Association to Hold Convention

The annual State convention of the Missouri Association of Public Utilities will be held this year on April 23, 24, and 25 at the Elms Hotel, Excelsior Springs, Mo. Ben C. Adams, president of the Association, will preside at the business sessions.

The membership of the Association includes virtually all of the privately-owned electric, gas, water, and transportation companies in Missouri.

Some of the subjects will be: "Yesterday, Today, and Tomorrow"; "Gearing Industry to National Defense"; "Community Development"; "The Economic Future of the United States"; "Your Crime Against Safety"; "Looking Ahead."

A Safety Meeting in charge of the Accident Prevention Committee will open the convention. A Safety demonstration will be given by the Safety team of the St. Joseph, Mo., Railway, Light, Heat & Power Company.

A statewide Speaking Contest for employees of electric and gas companies in Missouri for cash prizes will be held on the evening of April 23.

An Open Forum on the afternoon of April 24 for the discussion of timely utility problems will be in charge of E. H. Lewis, Webster Groves, Mo. All available past-presidents of the Association will be seated at the head table as guests of honor at a Get-Acquainted luncheon at noon on April 24.

The program is in charge of a committee under the direction of C. D. Greason, Kansas City, Mo. An entertainment program is being arranged by a committee under Paul C. Ford, Kansas City, Mo.

Pacific Coast Convention in May

The annual convention of the Pacific Coast Electrical Association will be held at the Hotel del Coronado, Coronado, Calif., May 21, 22, 23 and 24.

The theme which has been adopted for the convention is The Electrical Industry's Contributions to Progress, and the whole program will be directed toward the presentation of material which will develop this thought.

Each branch of the industry will be provided with an opportunity to present the story of its particular accomplishments along this line.

ELECTRIC REFRIGERATOR AND ELECTRIC RANGE SALES

Household Models Only

FOR MONTHS OF DECEMBER, 1939 AND 1940, AND YEARS OF 1939 AND 1940

States	ELECTRIC RANGES				ELECTRIC REFRIGERATORS			
	Dec. 1940	Dec. 1939	Year 1940	Year 1939	Dec. 1940	Dec. 1939	Year 1940	Year 1939
Total United States	26,500	14,453	436,505	320,753	115,236	92,479	2,718,714	1,956,002
Maine	165	95	3,135	3,250	353	294	10,812	7,880
New Hampshire	82	147	2,767	1,930	373	24	7,559	5,510
Vermont	135	45	1,491	1,576	199	201	5,464	3,729
Massachusetts	587	479	10,307	7,861	4,092	4,317	97,749	75,094
Rhode Island	133	18	1,193	941	763	375	11,905	9,714
Connecticut	621	207	7,208	4,942	2,559	(597)	43,634	31,344
Total New England	1,723	991	26,101	20,500	8,339	4,614	177,123	133,271
New York	1,749	902	20,707	14,600	11,860	12,249	307,963	265,854
New Jersey	293	14	6,096	4,391	4,405	2,267	107,024	74,632
Pennsylvania	1,663	902	30,038	22,185	9,806	8,373	244,048	182,911
Total Middle Atlantic	3,705	1,818	56,841	41,176	26,071	22,889	659,035	523,397
Ohio	1,847	1,311	38,228	23,643	7,703	5,395	175,162	112,655
Indiana	880	533	20,376	14,542	3,697	2,502	78,834	49,323
Illinois	1,641	810	26,292	19,196	8,054	7,667	214,610	157,439
Michigan	3,370	2,121	38,645	29,164	6,367	3,892	140,302	91,223
Wisconsin	1,105	803	17,197	14,102	1,793	2,162	59,810	41,132
Total East North Central	8,843	5,578	140,738	100,647	27,614	21,618	668,718	451,772
Minnesota	850	859	15,061	12,496	4,046	2,246	75,672	51,521
Iowa	495	147	7,102	5,441	2,304	1,372	48,792	35,073
Missouri	810	303	12,117	9,578	3,327	2,543	70,933	54,976
North Dakota	127	159	2,508	2,364	(17)	140	5,167	3,880
South Dakota	135	177	2,622	2,519	215	202	6,118	4,962
Nebraska	115	51	2,479	1,770	1,013	571	20,920	14,870
Kansas	224	65	4,273	3,208	1,056	845	25,259	18,240
Total West North Central	2,756	1,761	46,162	37,376	11,944	7,919	252,861	183,522
Delaware	18	14	629	347	292	181	6,452	3,993
Maryland	289	166	3,297	2,354	1,820	2,144	32,947	24,406
District of Columbia	296	199	2,751	2,793	1,288	977	20,502	20,790
Virginia	351	122	8,197	5,978	2,324	1,538	41,262	31,318
West Virginia	26	95	3,114	2,560	1,111	760	27,411	19,289
North Carolina	697	433	11,540	10,765	1,593	1,145	47,052	34,327
South Carolina	183	167	6,113	3,405	758	661	23,222	15,347
Georgia	777	134	11,762	7,246	1,660	771	41,998	27,527
Florida	1,021	624	15,729	11,859	2,954	2,508	42,858	28,473
Total South Atlantic	3,658	1,954	63,132	47,307	13,800	10,685	283,704	205,470
Kentucky	65	32	2,721	2,234	2,147	1,118	38,975	26,823
Tennessee	1,026	352	16,446	9,989	1,889	1,191	46,616	32,573
Alabama	1,483	349	8,580	5,141	1,209	588	30,568	18,842
Mississippi	45	102	1,912	1,542	705	418	17,816	11,232
Total East South Central	2,619	835	29,659	18,906	5,950	3,315	133,975	89,470
Arkansas	111	18	1,099	659	638	661	19,761	11,941
Louisiana	(80)	(49)	475	823	1,358	1,029	33,176	25,024
Oklahoma	110	49	863	557	1,297	2,160	25,591	21,496
Texas	146	141	5,649	4,644	3,320	2,448	109,525	76,853
Total West South Central	287	159	8,086	6,683	6,613	6,298	188,053	135,314
Montana	125	32	3,433	1,510	520	173	8,083	5,357
Idaho	72	9	4,279	2,605	576	466	11,879	6,921
Wyoming	1	(8)	585	293	94	161	3,012	2,558
Colorado	140	(9)	2,368	2,112	867	907	19,033	13,248
New Mexico	17	2	240	194	272	125	5,358	3,228
Arizona	82	39	807	693	363	118	8,913	5,058
Utah	286	175	4,437	4,433	229	549	13,803	9,373
Nevada	92	58	1,194	726	(181)	119	2,725	1,780
Total Mountain	815	298	17,343	12,566	2,740	2,618	72,806	47,523
Washington	698	649	19,697	13,172	3,202	2,521	53,401	34,155
Oregon	505	275	13,932	9,973	1,477	1,710	28,265	16,046
California	891	135	14,814	12,447	7,486	8,292	200,773	136,062
Total Pacific	2,094	1,059	48,443	35,592	12,165	12,523	282,439	186,263

Figures based on report by the NEMA on Net Sales to Dealers and Jobbers.

Accident Prevention Committee Meeting

W. R. Smith, *Chairman*

A VERY successful meeting of the Accident Prevention Committee was held in Roanoke, Virginia, on February 10 and 11. All sessions were well attended by members of the committee and guests from neighboring electric light and power companies. Announcement was made by the chairman of the appointment of Mr. George S. Diehl, assistant to superintendent of operation, Pennsylvania Water & Power Company, to the vice-chairmanship of this committee. Mr. Diehl has been associated with the committee since 1925 and has been its liaison representative to the Hydraulic Power Committee and the Prime Movers Committee. The chairman also welcomed the following new members of the committee appointed since the last meeting:

H. F. Webb, general safety director, West Penn Power Company.

R. A. Bloomsburg, director of safety, Niagara Hudson Power Corporation.

E. E. Grover, manager of claims, Columbus & Southern Ohio Electric Company.

Mr. Goodale reported that preliminary data for 1940 received from committee members indicated that the curves on accident statistics would continue their downward trend. Complete data will not be at hand until later, when a more comprehensive report will be made. Cause and location data continue to show that 30 per cent of disabling accidents in the industry are occurring on overhead line work. Steam power plants, substations, consumers' premises and storerooms and yards account for approximately equal shares of another 40 per cent. Employee practices continue to be mainly the cause of nearly 60 per cent of the accidents and in his remarks on employee training Mr. W. A. Buchanan stressed the importance of this matter, especially with regard to the new and younger employees and called attention to the benefits which can come from training programs suited to the needs of older and more experienced men.

Mr. Rakestraw, in his report on traffic hazards, showed an interesting motion picture short which had been produced in his company for use in driver training. Mr. Diehl presented an excellent and comprehensive report on the hazards of kite flying near transmission lines, based on the replies to a recent questionnaire to committee members on this subject. The specific recommendations of this report will be brought to the attention of all member companies later.

Mr. E. C. Rue submitted to all committee members the latest draft of the proposed *Lineman's Handbook*, which is a revision of the former NELA booklet, *Accident Prevention Course for Linemen*. This draft is to be reviewed by all committee members for full discussion at the May meeting.

At the Monday afternoon session Mr. H. B. Whitaker, assistant chief engineer, Underwriters' Laboratories, Inc., made an interesting presentation of the subject of electric shock as it pertains to the electric fence, which was based on the investigation recently made into this subject by Underwriters' Laboratories. This matter is one that has come very rapidly to be of interest to many companies in whose territories home-made and otherwise unsatisfactory and dangerous devices have been installed by individuals not properly informed. The committee hopes to render service in connection with the development by the National Safety Council of suitable educational materials related to this matter.

The chairman informed the committee of the recent death of Mr. C. R. Scott, former chairman of the Accident Prevention Committee of the NELA. The committee, in formal action, expressed its desire that a suitable resolution be prepared expressing the recognition by the committee of the great service rendered by Mr. Scott in the cause of accident prevention in the electric light and power industry, and that such be sent to the proper persons with an expression of the committee's sympathy.

Electrical Equipment Committee Meeting

R. W. Wilbraham, *Chairman*

THE winter meeting of the Electrical Equipment Committee, EEI, was held at the Hotel Statler, Detroit, Mich., Feb. 10 and 11.

The first day was a closed session meeting where problems relating to national defense, apparatus troubles, oil fires, transformer standards, system interconnection, joint studies relating to sales and research, were discussed. The second day was an open session meeting devoted to station design, apparatus design, motor starting current, and utilization voltages. In addition, in the afternoon the Detroit Edison Company presented informal discussions on the following subjects relating to their new developments:

Developments in Underground Distribution.

Application of Basic Design to Various Types of Substations.

Conversion of 24 Kv to 40 Kv Transmission for Outlying Areas.

120-Kv Experimental Cable Installation.

New System Control Center.

Mr. S. Van Veen of the Cincinnati Gas and Electric Company presented a paper outlining the effects of national defense activities on utility personnel. He estimated that an average of about 38 per cent of the male employees might be affected under the Selective Service Act, as members of the National Guard, or as reserves of the Army or Navy. In order to meet the problems presented, plans are being made to train additional men, take back retired employees, and substitute, where possible, female employees for male. In addition, consideration is being given to increasing the hours of labor in many categories.

Mr. W. F. Nimmo, on behalf of Mr. E. S. Fitz, presented a summary of some of the precautions being taken by power companies for the protection of plants.

Mr. J. O'R. Coleman stated that in response to an invitation from Chairman James Lawrence Fly of the Defense Communications Board, the Institute was represented on the Telephone Committee, the Telegraph Committee and the Radio-Communications Committee of the Board. The purpose of this Board is to coordinate planning for the most efficient control and use of radio, wire and cable communication facilities under jurisdiction of the United States

in time of national emergency. The work of these committees may involve the collection of extensive information on the communication systems of various power companies.

Mr. R. N. Conwell presented the annual report on the study of oil fires, which summarized the twenty cases of fire or explosion which occurred between Oct. 10, 1938 and Jan. 1, 1941. The report pointed out the various factors involved in each situation and the method used for extinguishing the fire.

Mr. R. T. Henry, on behalf of Mr. G. Sutherland, presented the 1940 Outdoor Bushing Failure Data. These data are being collected on all bushings purchased since Jan. 1, 1932 and present indications are that the actual failure rates on modern bushings are still very low. The rehabilitation and actual replacement figures under 1941 are also low in percentage of the total bushings installed. Many operating companies reported their procedure of testing and rehabilitation. It is hoped that this information will be of value to other organizations in showing what is being done in many other companies.

Mr. A. P. Fugill of the Detroit Edison Company presented a report on the company's study of transformer noise. The purpose of this study is to specify reasonable limits, so that power companies may obtain the quietest transformers from normal design without sacrifices in cost, weight, size or performance. Transformer noise is rather generally accepted as caused by magnetostriction effects in the core. The vibration of coils due to current does cause some noise, but it is negligible compared to that produced by the core. According to the magnetostriction theory, when a strip of iron core is magnetized its length increases and its cross-section decreases, all dimensions returning approximately to normal when the flux goes through zero. There is also a magnetostriction hysteresis effect to make phenomena more complicated. This movement is inherent in each lamination of core iron and cannot be eliminated merely by clamping the laminations together, because the core is moving as a unit. This movement is transmitted to the oil, which is uncompressible and, in turn, causes the tank to vibrate. The tank vibration, of course, sets the air in motion to cause the noise picked up by the ear. Mr. Fugill presented curves showing the present NEMA limit on transformers and a proposed limit which he believes would result in much more satisfactory transformers from the users' standpoint.

Mr. F. S. Brown, chairman of the utility representatives on Sectional Committee C57 for Transformers, Regulators and Reactors, called the attention of the committee to the fact that the proposed standards have been out for trial and criticism for nearly a year, and requested comments on these standards not later than March 1, 1941, so that these could be considered in the preparation of the final American Standard, which will be undertaken early this spring.

Mr. H. A. Dryar presented a paper discussing the basic arrangements and operation of the interconnected systems of the Philadelphia Electric Company, the Public Service Electric and Gas Company, and the Pennsylvania Water and Power Company. This interconnection of three major independent systems started in 1922 with the establishment of 26-kv ties between Philadelphia, Pennsylvania and Camden, New Jersey for the delivery of firm energy to Camden. It was further expanded with a 66-kv tie between Philadelphia and Trenton in 1925, and in 1927 an agreement was reached for the construction and operation of the 220-kv Pennsylvania-New Jersey interconnection. This arrangement provided that the member companies would so develop and operate their systems as to obtain the fullest practical advantages from load diversity and would render each other service of mutual advantage.

The correlation of rates, sales and engineering in the fullest development of the industry was ably brought forward in papers presented before the committee. Mr. F. A. Newton, chairman of the Rate Research Committee, presented a paper emphasizing the engineering factors needed for the consideration of rate making. Mr. H. E. Dexter, on behalf of the Sales Committee, discussed some engineering factors involved in sales, pointing out the consideration which must be given to the customer's viewpoint in order that the industry may render maximum service. The various factors brought up in these papers were fully discussed by members of the committee. As a result of these presentations, the Electrical Equipment Committee agreed wholeheartedly to extend further their cooperation with the Sales and Rate committees in order to find complete and correct answers to the problems presented. The discussion centered around problems relating to the most efficient supply of electric energy for fluorescent lighting and other low power factor loads, the supply of energy for water heating and the problems associated with demand metering for small commercial customers.

Mr. F. W. Cramer of the Carnegie-Illinois Steel Corporation described the power supply systems necessary for the operation of large steel mills. Problems associated with the use of by-product fuel, large fluctuating loads, and electrical protection of the transmission and distribution systems of a steel mill, were all ably presented. Under the sponsorship of Mr. E. B. Shew presentations were made on various methods of protective isolation of metal switchgear. These included the use of metal only, of masonry only, and of a combination of masonry and metal, in order to insure adequate isolation between various sections of bus structure. The advantages and disadvantages of the various types of assembly were thoroughly reviewed.

Mr. J. H. Foote described briefly the recent joint activities undertaken with representatives of the National Electrical Manufacturers Association, looking forward to a mutually acceptable solution of the problem of motor starting current. The EEI representatives on the joint committee are:

B. C. Sherwood, chairman, Commonwealth Edison Company.
Gilbert Cooley, Long Island Lighting Company.
Ira L. Craig, Philadelphia Electric Company.
J. H. Foote, Commonwealth & Southern Corp.
G. M. Nash, Central Hudson Gas & Elec. Co.
A. B. Campbell, Alt., Edison Electric Institute.
J. O'R. Coleman, Alt., Edison Electric Institute.

The NEMA representatives on this committee are:

C. W. Falls, chairman, General Electric Company.
J. L. Hamilton, Century Electric Company.
C. P. Potter, Wagner Electric Corp.
G. L. Ringland, Allis-Chalmers Mfg. Co.
J. O. Walz, Westinghouse Elec. & Mfg. Co.

This joint committee held one meeting, in which many of the basic fundamentals of motor design and distribution system design were reviewed. Additional information is now being obtained on both subjects and a second meeting is planned for March 5.

The next meeting of the Electrical Equipment Committee will be held at the Edgewater Beach Hotel, Chicago, Ill., May 5 and 6, in conjunction with the meeting of the other engineering committees.

Prime Movers Committee Meeting

E. L. Hopping, *Chairman*

ABOUT 35 members and 10 guests attended the meeting of the Prime Movers Committee, EEI, which was held at the Netherland Plaza Hotel in Cincinnati on February 3 and 4. Many interesting operating and engineering problems were thoroughly discussed in the round table sessions which featured the meeting.

The final draft of the report of the Chemists' Subcommittee was presented by Mr. Miller. It was accepted and referred to the Editing Committee. The forthcoming report of the Subcommittee on Metallurgy and Piping, completion of which will be delayed until more information is available on bolts and bolting materials, was the subject of a discussion led by Messrs. Boetcher, Crocker and Krieg. Chairmen of other subcommittees stated that progress was being made in the preparation of their reports.

Several members took advantage of the opportunity to visit the West End and Columbia stations of the Cincinnati Gas and Electric Company and the Millers Ford Station of the Dayton Power and Light Company.

The next meeting of the Prime Movers Committee will be held in Chicago in May, 1941.

Meter and Service Committee Meeting

F. B. Davis, *Chairman*

THE 20th meeting of the Meter and Service Committee, EEI, was held February 6 and 7, 1941, at the Essex House Hotel in Newark, N. J. In keeping with the practice of the past several years, the meeting followed by one day the meeting of the Committee on Metering and Service Methods of the Association of Edison Illuminating Companies and was, in turn, followed by a joint meeting with the American Meter Manufacturers.

A fine spirit of cordiality and cooperation exists between these two committees, some member companies being represented in both committees by the same individuals, and the work of the two committees has been arranged so that duplication is avoided and so that the results of the work of both committees will be available to both committee memberships. This not only will save time and expense but will permit the consideration of more subjects of importance in the available meeting time.

The Newark meeting was taken as an occasion to honor a number of former committee associates and one present member who are retiring this year or have already retired after long and active careers in the meter industry. The program culminated in a dinner attended by about 250 men, all of whom either are now or have been closely associated with meter work in the electric utility and manufacturing industries.

The honored guests at the meeting were each presented with a small token of their associates' esteem for them and in appreciation of their contributions both individually and collectively to the art of electric metering.

Two of the invited guests of honor, Mr. C. G. Durfee of the Rochester Gas and Electric Company and Mr. W. H. Fellows of the Potomac Electric Company, who are at present sojourning in the South, were unable to be present. However, Mr. W. M. Bradshaw of the Westinghouse Electric & Manufacturing Company, Mr. W. H. Pratt of the General Electric Company and Mr. J. S. Cruikshank of the Consolidated Gas, Electric Light and Power Company, Baltimore, who is a present member of the A.E.I.C. Committee, were all present and the occasion was a most pleasant one.

Since the time of the last report, a new member has been added to the Meter and Service Committee. Mr. I. N. Schwartz of the Columbus and Southern Ohio Electric Company. The membership now totals 17 active members and eight sectional correspondents, which not only represents most sections of the country but also operating companies having installed a large portion of all the electric meters in the country.

The next meeting has been set for May 5 and 6 at Chicago, which is the time of the general session of the Institute's engineering committees.

The following is a brief discussion of the work of several of the more important subcommittees:

1. *Joint Committee on Standards for Electricity Meters*

A temporary joint committee of the two meter committees met with the meter manufacturers in Detroit on January 17, 1941, with the result that they recommended to the main committees that a permanent joint committee be set up for the purpose of furthering meter standardization and eliminating in so far as practicable special features and requirements in the industry. The belief is that those who can use equipment built in accordance with recommended standards that have the approval of the majority of the two committees, and in which the manufacturers generally concur, will ultimately benefit materially. The active cooperation of the manufacturers is essential and the joint committee will provide a forum which has not been available before.

The joint committee will comprise not more than four representatives of each meter committee with total membership not to exceed six, the chairman chosen to be a member of both committees. The manufacturers will be invited to attend the sessions of the committee but no more than six manufacturers to be in attendance at any one time. The joint committee will not be given authority to make any decisions binding on the main committees but will serve merely as a correlating committee and make recommendations to the main committees for final decision.

The committee will also handle the matters of procedure, form and method for the issuance of recommended standards and will review existing standards to determine any necessary revisions and set them up for final printing and issuance.

2. *Standardization of Current Transformers for Primary Circuits*

The further development of so-called long-range current transformers has been abandoned for the time being. However, the matter of standardization of dimensions of indoor types is being actively prosecuted with the manufacturers and some progress is being made.

It was noted in a previous report that Allis-Chalmers Company has available a current transformer capable of operating at 200 per cent of rating continuously but with restricted burden ability. It is for metering purposes only and cannot be used as a general purpose unit.

3. *Standardization of Demand Registers and Scales*

The work of this subcommittee has proceeded to the point that with some additional work it may be completed. However, in order that a desirable standard may be arrived at, it will be essential that some operating companies change their present practices with respect to scale values and demand constants. This will not be easy, but if substantial agreement can be reached, the number of registers of a given type required for a given type of meter may be reduced from several hundred to about 48 and it is hoped that the desired agreement may be reached.

4. *Standardization of Thermal Demand Meter Ratings and Scales*

Agreement was reached to make thermal demand scales coincide with demand register scales and meter ratings. This is a considerable accomplishment on the part of the subcommittee and the next step is to obtain a similar agreement among the manufacturers. When this is done the rest of the work will be comparatively simple.

5. *Cumulative Type Demand Registers*

A preliminary report on this subject which was presented orally will be sent to members. It is the subcommittee's intention to make a very comprehensive report on the value of cumulative registers for the guidance of member companies in their consideration of this difficult problem.

6. *Other Subjects*

Several of the less important subjects have been completed and some progress reported on the others.

The Meter and Service Committee would be pleased to have any questions regarding subjects properly within its province referred to it at any time and it will endeavor to provide answers of the desired adequacy without unnecessary delay.

Transmission and Distribution Committee Meeting

W. F. Nimmo, *Chairman*

ONE of the best attended meetings of the EEI Transmission and Distribution Committee in recent years was held at the Statler Hotel in Detroit, Michigan, February 17, 18 and 19, 1941.

The first day of the meeting was devoted to the program of the Underground Group, of which T. G. Hieronymus is chairman. M. W. Ghen presented a progress report for the Subcommittee on Non-Inflammable Liquid-Filled Transformer Operation. This contained a tabulation of data obtained through the circulation of a questionnaire which indicated the trend in the use of this equipment since it was first adopted for commercial use about nine years ago. A summary of the report is scheduled for early appearance in the BULLETIN.

A brief report was submitted on transformer vault disturbances on customers' premises and under sidewalks during 1938 and 1939. This indicated a performance record of transformer vaults during these two years of operation of a high degree of reliability in safeguarding buildings, their occupants and contents against such hazards as exist due to transformers in customers' vaults and under sidewalks.

W. F. Davidson made a progress report on the development of cold setting compounds for temporary cable joints. This study is directed toward having available for quick and emergency use a cold setting compound in order to facilitate restoring service through circuits in cables that may be damaged due to one cause or another.

G. B. McCabe presented a progress report on the impulse testing of 24-kv type H cable with conductor shielding. It will be recalled that Mr. McCabe presented results of a number of impulse tests on 4800-volt potheads and 4800-volt cables having various kinds of insulation, and on one make of 24-kv type H paper-and-lead cables with conductor shielding at the last previous meeting of this committee, held in Atlanta, Ga., last October.

L. G. Colson presented a paper illustrated with numerous slides on Deep Underground Conduit Installations Using Caisson Casings and Sluicing Methods. This type of conduit installation utilizes hydraulic pressure for forcing precast conduit runs underground between manholes where structural conditions make it practically impossible to excavate for conduits by conventional methods. The method was developed by the Consolidated Edison Company of New York and is finding application under a number of conditions where conduit installation would otherwise be very difficult.

L. I. Komives described and illustrated by lantern slides, the cable-reconditioning plant and duct splicing cables used by Detroit Edison Company. This makes possible the re-use of cables and utilizing short lengths of cables by making splices that are drawn into ducts. Detroit Edison has 6000 duct splices in operation and during the past eight years only six failures in such splices have occurred, Mr. Komives reported.

G. B. Shanklin presented a report prepared by the Insulated Power Cable Engineers Association on the current-carrying capacity of power cables. For several years the IPCEA has been compiling a complete set of current-carrying capacity tables covering standard conditions for all kinds of insulated power cables in air, underground ducts and indoor conduit. The results of these efforts were presented by Mr. Shanklin in the form of three separate tabulated interim reports covering, respectively, rubber, varnished cambric and impregnated paper cable of all available sizes and voltage ratings. It is intended that these tables will be given trial use for some such period as one year, in order to obtain experience upon which such changes as may be necessary may be made before issuing these current carrying capacities in final form.

Brief progress reports were made for the subcommittee on Underground Low Voltage AC Networks, and Investigation of Methods of Obtaining Cable Temperatures, by C. W. Franklin and W. B. Elmer, respectively.

At the Atlanta meeting a small subcommittee was appointed under the chairmanship of E. W. Oesterreich to investigate the economic justification of increased cable ratings for war industry loads. Mr. Oesterreich made a brief verbal report covering the investigation made thus far by this subcommittee.

Most of the afternoon of the first day was devoted to a round table discussion of the following subjects: arc-proofing cements and their possible adverse effects on rigidity of cables; emergency stocks of underground cable; training of cable splicers, and sectionalizing devices operating at distribution voltages.

The second day of the meeting was given over to the Plant Coordination, Overhead Transmission, and Standards

and Specifications groups. W. F. Davidson reported on the progress being made in studying the Susceptibility of Multiplex Telegraph Circuits as this is related to the coordination of power and telegraph circuits. He also described the use and application of a new weighting curve for telephone influence factor and reported that radio noise meters are now available from two manufacturers whereby reliable field data may now be taken on radio interference due to various causes. He recommended that power companies arrange to procure for use in their respective areas, one or more of these noise meters so that a sufficient number of field measurements may be taken to facilitate the drawing of conclusions relative to radio interference complaints.

Dr. S. K. Waldorf gave a very interesting demonstration and talk, illustrated with charts and slides, on preventative lightning protection on transmission lines. An interesting colored motion picture film was shown by A. E. Davison on Wiring The Wilderness. This showed the construction of transmission lines in some of the northern Canada areas during winter months in connection with gold mining developments. This was followed by an address by R. M. Waggoner on Standardization From the Manufacturer's Viewpoint.

Except for a short meeting at which a report was made on two subjects under the Cooperative Projects Group, the afternoon was devoted to individual subject sessions on these subjects: Distribution Transformer Standards, Utilization Voltages, Street Lighting. Tree Trimming Practices and Material Standards.

The third day of the meeting was taken up with the presentation of reports of the subject sessions held on the preceding afternoon and a final report on Transformer Load Supervisions and a discussion of a proposal for a study of transformer maintenance.

Under the program scheduled for the Utilization Voltages Subcommittee, there were presented a paper entitled "Suggested Approach to the Problem of Utilization Voltage Standards" by H. P. Seelye, and an interim report of the Subcommittee by C. E. Arvidson.

W. B. Elmer presented a prepared discussion on Series and Multiple Street Lighting Systems, which has been under consideration for several months and which set forth the advantages and disadvantages of these two types of systems for street lighting purposes.

At the afternoon session of the third day, the committee received the Second Report on Distribution Transformer Standards. The First Report was made about one year ago and became available in published form last July as EEI Publication G-6. Brief reports were made under the Standards and Specifications Group's program on distribution fuses, timber products, line hardware and porcelain insulators.

An interesting feature of this last session was pictures with commentary provided by the Detroit Edison Company especially for this meeting to show various phases of company plant and operations in which the members of this committee were interested. This was intended to take the place of inspection trips which ordinarily would have been taken by many of those attending the meeting.

The spring meeting of the Transmission and Distribution committee will be held at the Edgewater Beach Hotel, Chicago, Illinois, on May 5, 6 and 7, 1941.

Joseph M. Burchill

JOSEPH M. BURCHILL, vice-president and a director of American Gas and Electric Company and of American Gas and Electric Service Corporation, and for several years prominent in the work of accounting committees of the Edison Electric Institute, died February 15 at his home in Forest Hills, N. Y. He was 46 years old.

Mr. Burchill began his career with American Electric Power Company in Philadelphia. When that company was taken over by American Gas and Electric Company in 1925, he moved to New York to become associated with the parent organization. In 1938 he was elected a vice-president and a member of the board of directors. He was also a vice-president and a director of Scranton Electric Company and a director of Southern Ohio Public Service Company, both units of the American Gas and Electric Company system. During the World War he served abroad for 17 months as first sergeant of a Motor Transport Corps of the American Expeditionary Force and was cited by General Pershing for meritorious conduct and heroism in action.

Mr. Burchill's special field was finance and accounting. He was chairman of the EEI Statistical Committee in 1936 and 1937 and for the past three years had been active as a member of the Depreciation Committee.

James M. Bennett

JAMES M. BENNETT, assistant to the president of the Philadelphia Electric Company and long associated with public relations, newspaper, and publicity work, died at his Philadelphia residence on Monday, January 27.

He was appointed publicity manager for the United Gas Improvement Company, Philadelphia, in 1921, and seven years later, in 1928, was made manager of public relations of the Philadelphia Electric Company.

Appointed a member of the American Commission for Relief of Belgium, in 1914, he spent the greater part of two years in the occupied country and, largely through his urgings, Cardinal Mercier wrote his historic book on his wartime experiences.

He was a descendant of Richard Bennett, Colonial Governor of Virginia, and of Stephen Milburn, who settled at St. Mary's City, Maryland, in 1634, in the colony founded by a brother of Lord Baltimore.

His wife, Susette, and a daughter, Mrs. J. C. Montgomery, of Detroit, Michigan, survive.

Charles B. Scott

CHARLES B. SCOTT, president of the Bureau of Safety, Chicago, and nationally prominent figure in accident prevention work, died Jan. 20 at the age of 74. For many years Mr. Scott was chairman of the Accident Prevention Committee of the National Electric Light Association. He was also one of the most active in the National Safety Council, having served it as treasurer, vice-president and president.

Mr. Scott became associated with the utility industry in 1907, when he was placed in charge of claims for United Gas and Electric Company in his native town of New Albany, Ind. Two years later he was appointed assistant to the general manager. In 1912 he went to Chicago to take charge of insurance for the newly organized Middle West Utilities Company. There he organized the Bureau of Safety as a department to handle the accident prevention work of Middle West Utilities. Other companies of the Insull system, recognizing the benefits of organized accident prevention, requested the services of the bureau, and it was incorporated as a separate organization in 1915.

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D-14—Vol. IV—Engineering Reports of the Joint Subcommittee on Development and Research (1/37)	5.00	10.00
D-13—Vol. III—Engineering Reports of the Joint Subcommittee on Development and Research (1/37)	5.00	10.00

Miscellaneous Publications

Basic Factors of Adequate Wiring (1939)	$0.25	$0.25
Covered Neutral Cable Helps Sell Adequate Home Wiring (1939)	.25	.25
Commercial Building Rewiring Market (1939)	.35	.35
(Price on three books as a group is 60c. per set)		
Good Radio Reception (1937). 100	$ 4.00	
1,000	25.00	
3,000	60.00	
5,000	95.00	
10,000	175.00	
25,000	325.00	
Proceedings—3rd National Accounting Conference (1939):		
Accounting Executive Group (printed)	1.00	1.00
Classification of Accounts Group (mimeographed)	.50	.50
Customers' Relations, Commercial Accounting and Records Group (mimeographed)	1.00	1.00
Depreciation Group	.50	.50
Plant Accounting & Records Group (mimeographed)	1.00	1.00
Purchasing, Stores & Transportation Group (mimeographed)	1.00	1.00
Complete set	3.00	3.00
Proceedings—2nd National Accounting Conference (1938):		
Complete Set (Mimeographed)	1.50	1.50

STATISTICAL RESEARCH DATA

H-2—Electric Light and Power Industry in 1939 (3/40)	.30	.75
G-2—Electric Light and Power Industry in 1938 (5/39)	.30	.75
F-4—Electric Light and Power Industry in 1937 (4/38)	.30	.75
E-2—Electric Light and Power Industry in 1936 (1/37)	.30	.75
D-2—Electric Light and Power Industry in 1935 (6/36)	.30	.75
B-9—Electric Light and Power Industry in 1933 (10/34)	.30	.75
A-1—Electric Light and Power Industry in 1922 (8/33)	.30	.75

SUGGESTIONS FOR SPECIFICATIONS

MS-1—Suggestions for Specifications for Standard Dial Constants for Alternating Current Watthour Meters (8/40)	.10	.10
MS-2—Suggestions for Specifications for Coordinated and Standardized Low Voltage Metering Current Transformers (8/40)	$0.10	$0.10
TD-1—Suggestions for Specifications for Bolts and Nuts (5/37)	.20	.20
TD-2—Suggestions for Specifications for Anchor Rods (6/39)	.10	.10
TD-3—Suggestions for Specifications for Lag Screws (10/38)	.10	.10
TD-4—Suggestions for Specifications for Eye Bolts (6/39)	.10	.10
TD-6—Suggestions for Specifications for Steel Crossarm Braces (5/40)	.10	.10
D-8—Suggestions for Specifications for Straight Tinned Copper Connectors (10/40)	.10	.10
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TD-61—Suggestions for Specifications for Type "A" Untreated Douglas Fir Crossarms (11/40)	.10	.10
TD-62—Suggestions for Specifications for Type "B" Untreated Douglas Fir Crossarms (11/40)	.10	.10
TD-71—Suggestions for Specifications for Insulator and Pin Threads and Gauges (5/37)	.10	.10
10 to 49 copies 25% discount		
50 or more copies 50% discount		

E.E.I. REFERENCE BOOKS

G-8—Electrical Metermen's Handbook (1940)	2.40	3.60
D-3—Storm Loading and Strength of Wood Pole Lines and a Study of Wind Gusts (1936)	2.00	5.00
Handbook of Interior Wiring Design (1937)	.50	.50

PERIODICALS

Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Electrical Research Statistics (Monthly)	N/C	3.00
Rural Electrification Exchange (Quarterly)	.50	1.00
Weekly Electric Power Output (Weekly)	N/C	3.00

ACCIDENT PREVENTION—RESUSCITATION

E-12—Resuscitation Booklets (7/37)	1— 9 copies	.10 each
	10— 99 "	.08 "
	100—499 "	.06 "
Your Unseen Helper (1936)	1,000	$10.
	5,000	30.
	10,000	50.
	25,000	110.
C-14—Resuscitation Charts (4/36)	.10	.10
C-12—Twelve Messages on Accident Prevention in the Electric Public Utilities (12/35)	.10	.10

PERSONALS

SAMUEL W. MURPHY, for the past four years vice-president of Electric Bond and Share Company, has been elected president, succeeding S. R. Inch, who recently resigned to devote all his time to the affairs of Ebasco Services, Inc. Mr. Murphy joined the staff of Electric Bond and Share Company in 1923, after several years with New York law firms. He was elected a vice-president of the company and of Ebasco Services in 1937 and became a director of Electric Bond and Share Company in the same year.

GEORGE G. WALKER has been elected vice-president of Electric Bond and Share Company. Mr. Walker joined the staff in 1924 and in 1927 became assistant to the chairman.

L. B. WIEGERS, formerly assistant secretary and assistant treasurer of Electric Bond and Share Company, has been advanced to secretary and treasurer. As secretary he succeeds E. P. Summerson, who has become president of Two Rector Street Corporation.

H. F. RAY has been named to succeed Mr. Wiegers as assistant secretary and assistant treasurer of Electric Bond and Share Company.

A. C. RAY, formerly treasurer of Electric Bond and Share Company and Ebasco Services, Inc., is now treasurer of Ebasco Services.

H. L. MARTIN, formerly assistant secretary and assistant treasurer of Ebasco Services, Inc., has been advanced to secretary of the service company.

R. H. FERGUSON, formerly vice-president and general manager, Georgia Power and Light Company, has been elected president of the Kentucky-Tennessee Light and Power Company, with headquarters at Bowling Green, Ky. He succeeds the late H. V. Armstrong.

McGREGOR SMITH, president, Florida Power and Light Company, has been appointed by Governor Cone as chairman of the power and fuel committee of the Florida State Council of Defense.

THOMAS D. JOHNSON has been elected a vice-president of Alabama Power Company. Mr. Johnson's association with the company began in 1916 and has since been interrupted only by the World War. Since 1922 he has been active in the new industries division, in which his work has been outstanding.

RALPH R. PITTMAN, electrical engineer for Arkansas Power and Light Company since 1925, has been promoted to chief engineer, succeeding C. S. Lynch, recently elected executive vice-president of the company. After several years with Emerson Electric Company in St. Louis, Mr. Pittman joined Arkansas Power and Light in 1919 as superintendent of the Pine Bluff division, from which position he advanced to electrical engineer six years later. In cooperation with material companies, Mr. Pittman and his staff developed a low-cost type of rural line which has been largely responsible for the extensive rural electrification program of Arkansas Power and Light and which was adopted in other sections by utility companies and the Rural Electrification Administration.

EDMOND S. McCONNELL has been appointed engineer on the staff of the Edison Electric Institute in New York. Mr. McConnell graduated from the University of Minnesota in 1924 as a Bachelor of Science in electrical engineering and three years later received the degree of Master of Science from Yale University. From 1928 to 1937 he was with Anaconda Wire and Cable Company, first as district engineer at Chicago and then as electrical engineer at Hastings-on-Hudson, New York. Later he was in charge of the preparation of the Copper Wire Engineering Association's sag and tension charts for copper conductors, and subsequently directed the association's field engineering service in connection with the rural distribution projects sponsored by the Rural Electrification Administration. More recently Mr. McConnell has been in private consulting practice relative to rural electrification.

LEONARD S. PHILLIPS, New York Steam Corporation, has been named president of the National District Heating Association, advancing to that position from the office of first vice-president. He succeeds Fred L. Witsell, who resigned because of his transfer from Toledo Edison Company to the presidency of the Pueblo (Colo.) Gas and Fuel Company.

JOHN M. ARTHUR, JR., Kansas City Power and Light Company, succeeds Mr. Phillips as first vice-president of the association.

RAYMOND M. NEE, Boston Edison Company, advances to second vice-president.

JOHN W. LAPHAM has been appointed acting secretary-manager of the North Central Electric Association. He will serve until May 1, 1941, when W. E. OLSON will return to the post from a temporary assignment with Northern States Power Company. Mr. Lapham will be on familiar ground, since he was secretary-manager of the association for many years prior to his retirement not long ago.

MERRILL DE MERIT has been appointed chief power engineer for Tennessee Valley Authority, with headquarters in Chattanooga. Mr. De Merit was formerly general and planning engineer for West Penn Power Company, Pittsburgh, having been associated with that company eighteen years.

J. H. COATES, industrial sales consultant, Ebasco Services, Inc., was elected chairman of the Interstate Power Club, organization of power sales engineers of New York and surrounding area, at the club's last 1940 meeting. Mr. Coates began his career as assistant commercial engineer for New York Edison Company in 1922 and subsequently served that organization as commercial engineer, assistant manager of the sales department technical bureau and supervisor of the sales department plant, studies division. He joined Ebasco Services in 1937.

JAMES ORR, superintendent of power for Hartford Electric Light Company for the past 18 years, has been named consulting engineer for the company. Mr. Orr has been a specialist in power plant operation since coming to this country from Scotland in 1893 and was for several years in the employ of Stone and Webster, Inc.

DWIGHT DOUGLASS has been appointed superintendent of power for the Hartford company, succeeding Mr. Orr. Formerly assistant superintendent, Mr. Douglass has been associated with the company during his entire career.

Power Sales Program

(*Continued from page 70*)

a frank review and appraisal of the progress these other sources have made and may be expected to make in their efforts to supply something almost as good as utility industrial service. How fast and far have the utilities advanced during the same period in technical improvements, cost reduction, etc.? In an equally frank look at the nearer side of the picture, H. A. Snow, Detroit Edison Company, will discuss "Electric Utility Progress—Past, Present and Future."

Just what the power man can accomplish toward eliminating three other principal sources will be summarized in a discussion of selling today by three authorities. E. L. Robinson, Gulf States Utilities Company, and G. J. Neighbors, Oklahoma Power and Water Co., will deal with the gas engine, Frank A. Wiatt, Cincinnati Gas and Electric Company, will dispose of the oil engine and O. R. Eichenberger, Consumers Power Company, will take care of steam. An open discussion period following the formal symposium will afford the delegates an opportunity to supplement and adapt the material presented to the maximum benefit of all.

The third session, Tuesday morning, April 1, will open with the spotlight on new developments that are of the utmost timely interest in today's industrial market. L. H. Knapp, The Hartford (Conn.) Electric Light Company, will present the latest information on several types of electric heating equipment, including induction, salt-bath and gas-atmosphere applications. An electrical heating process that is progressing rapidly in industrial use—and therefore in importance to the power salesman—will receive special attention in "Infra-Red Up-to-Date," by D. A. Aiken, Cleveland Electric Illuminating Company. Mr. Aiken plans to supplement his talk with a dramatic demonstration of new infrared applications that should provide plenty of grist for the half-hour discussion period that will follow.

A time of industrial activity, with the customer's output growing rapidly, is precisely the time to concentrate on efficient utilization—if both customer and utility are to avoid severe reaction when the spurt is over—in the expert opinion of the third speaker at this session, B. J. Martin of the magazine *Electrified Industry*. Mr. Martin is in close touch with every development in equipment, plant modernization and new uses for electric power on the entire industrial front.

In addition to power uses, the identification of the utility's welfare with the customer's includes everything that affects profit and loss in the customer's business. H. C. Thuerk, Utility Management Corporation, has been for many years a leading exponent of the doctrine that no one is better equipped to help the customer's progress in production and marketing methods than a good utility power man and that industrial betterment is a vital part of the power sales job. His address on "Building Your Customer's Business" will conclude the Tuesday morning session.

More ammunition for the 1941 sales firing line will be supplied at the final session on Tuesday afternoon. L. M. Taylor, Mississippi Power and Light Company, will answer the question, "How Do We Keep Up-to-Date?" in a presentation of ways and means for the power man to modernize his sales training. Another discussion period will follow his talk. Then S. A. Wills, Appalachian Electric Power Company, will take up the topic of sales tools and their effective use in getting better sales results.

Salesmen are always being told that they must understand the buyer's point of view. The power men will have an unusual opportunity to see themselves from the other side of the desk when Donald G. Clark, director of purchases for the Gulf Oil Company, discusses "Salesmen I Have Met."

Thus every major aspect of the power sales job will have been covered during the two-day conference. To help the delegates sum it all up in working concepts that they can take back home to their individual jobs, C. A. Eastman, Ebasco Services Inc., will conclude the final session by proposing a 1941 Model Sales Program that each man can develop and apply for himself.

CONVENTIONS AND MEETINGS

FEBRUARY

3-4 Prime Movers Committee, EEI, Netherland Plaza Hotel, Cincinnati Ohio.
10-11 Accident Prevention Committee, EEI, Roanoke Hotel, Roanoke, Va.
10-12 Electrical Equipment Committee, EEI, Statler Hotel, Detroit, Mich.
17-19 Transmission and Distribution Committee, EEI, Statler Hotel, Detroit, Mich.
17-21 National Electrical Manufacturers Association, Chicago, Ill.

MARCH

13-14 Southeastern Electric Exchange, Engineering and Operation Section, DeSoto Hotel, Savannah, Ga.
17-18 Oklahoma Utilities Association, Tulsa, Okla.
27-28 Missouri Valley Electric Association, Continental Hotel, Kansas City, Mo.
27-29 Northwest Electric Light and Power Association, Business Development Section, Davenport Hotel, Spokane, Wash.
31-Apr. 1 Power Sales Conference, Edgewater Beach Hotel, Chicago, Ill.
31-Apr. 3 Annual Sales Conference, EEI, Edgewater Beach Hotel, Chicago, Ill.

APRIL

7-8 5th National Accounting Conference, AGA-EEI, Netherland Plaza Hotel, Cincinnati, Ohio.
23-25 Missouri Association of Public Utilities, The Elms, Excelsior Springs, Mo.
29-30 Chamber of Commerce of the U. S. A., Washington, D. C.

MAY

1-3 Southeastern Electric Exchange, Annual Convention, Bon Air Hotel, Augusta, Ga.
5-8 Engineering Committees, E.E.I., Edgewater Beach Hotel, Chicago, Ill.
11-15 National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.
18-23 National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.
21-24 Pacific Coast Electrical Association, Hotel del Coronado, Coronado, Calif.
21-24 Pacific Coast Electrical Association, Annual Convention, Hotel del Coronado, Coronado, Calif.
23-27 Westinghouse Agent-Jobbers Association, The Homestead, Hot Springs, Va.
26-29 National Association of Purchasing Agents, Chicago, Ill.

JUNE

2-5 EDISON ELECTRIC INSTITUTE, Buffalo, N. Y.
10-13 National District Heating Association, William Penn Hotel, Pittsburgh, Pa.

SEPTEMBER

11-12 Empire State Gas and Electric Association, Annual Convention, Saranac Inn, Saranac, N. Y.

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Insurance, J. H. NICKELL, Philadelphia Electric Co., Philadelphia, Pa.

Membership, EDWARD REYNOLDS, Columbia Gas & Electric Corp., New York, N. Y.

Prime Movers, E. L. HOPPING, Philadelphia Electric Co., Philadelphia, Pa.

Prize Awards, H. P. LIVERSIDGE, Philadelphia Electric Co., Philadelphia, Pa.

Rate Research, F. A. NEWTON, The Commonwealth & Southern Corp., New York, N. Y.

General Sales, R. E. FISHER, Pacific Gas & Electric Co., San Francisco, Cal.

Statistical, W. T. NEEL, Philadelphia Electric Co., Philadelphia, Pa.

Transmission and Distribution, W. F. NIMMO, Virginia Electric & Power Co., Richmond, Va.

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